

SUPPLEMENT.

The Mining Journal, RAILWAY AND COMMERCIAL GAZETTE.

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

[The MINING JOURNAL is Registered at the General Post Office as a Newspaper, and for Transmission Abroad.]

No. 2464.—Vol. LII.

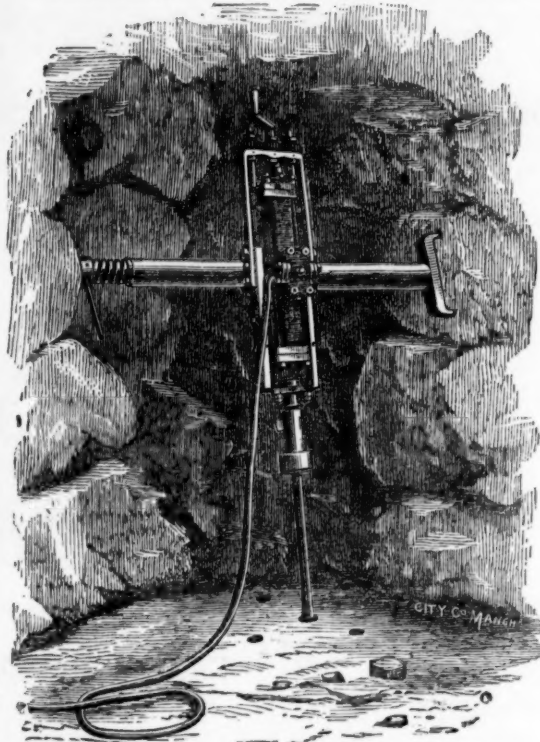
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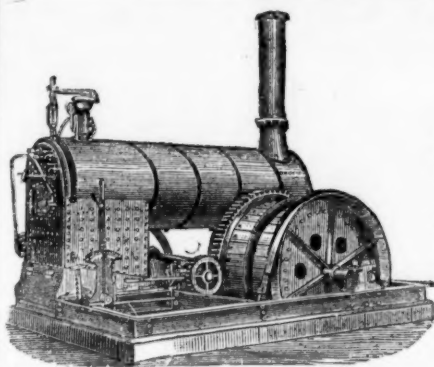
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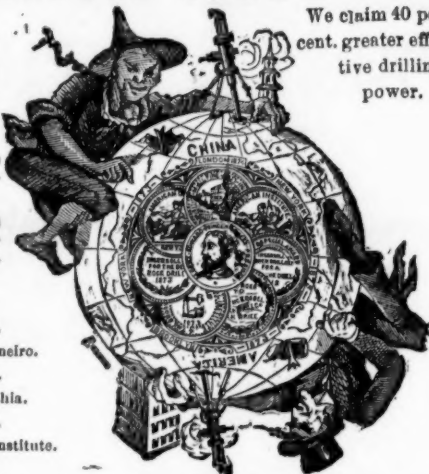
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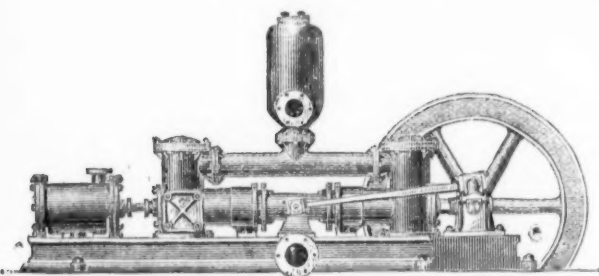
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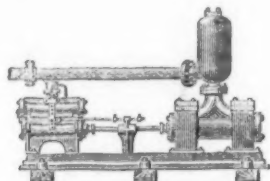


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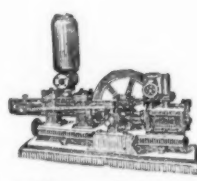
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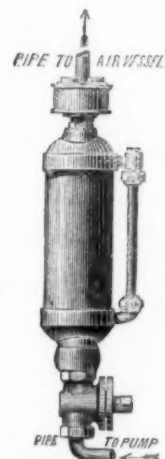
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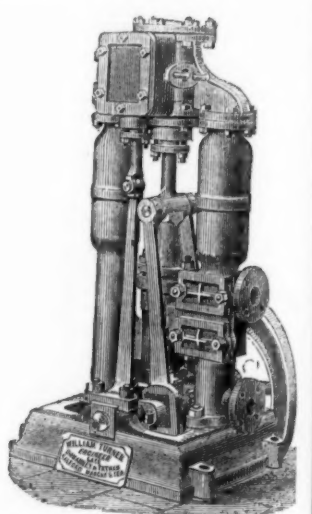
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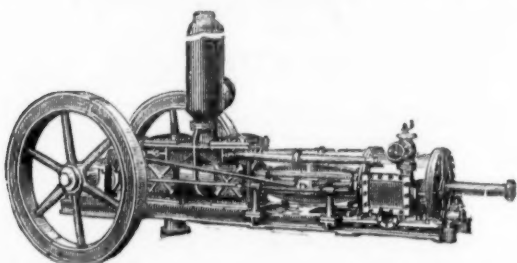
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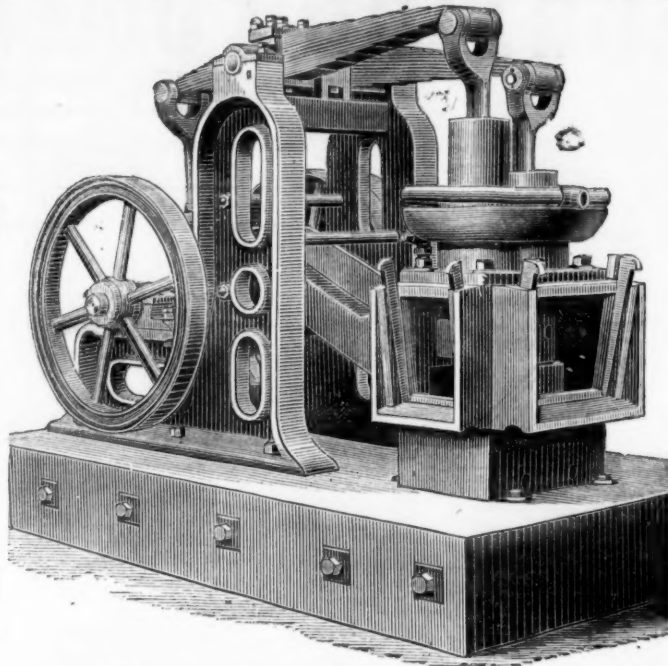
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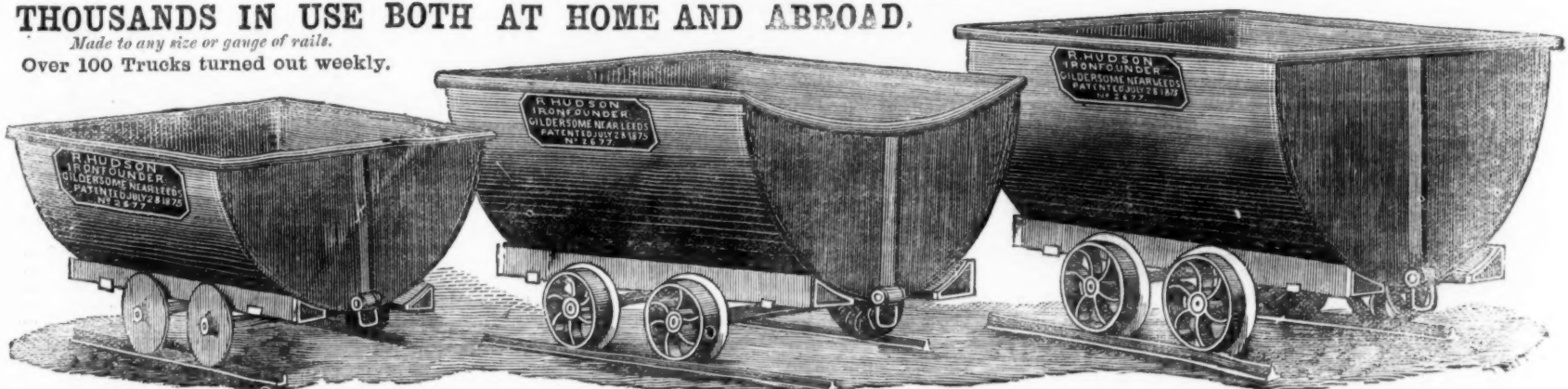
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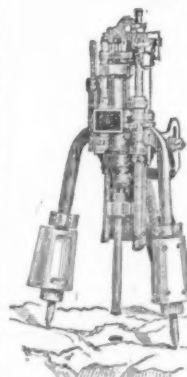
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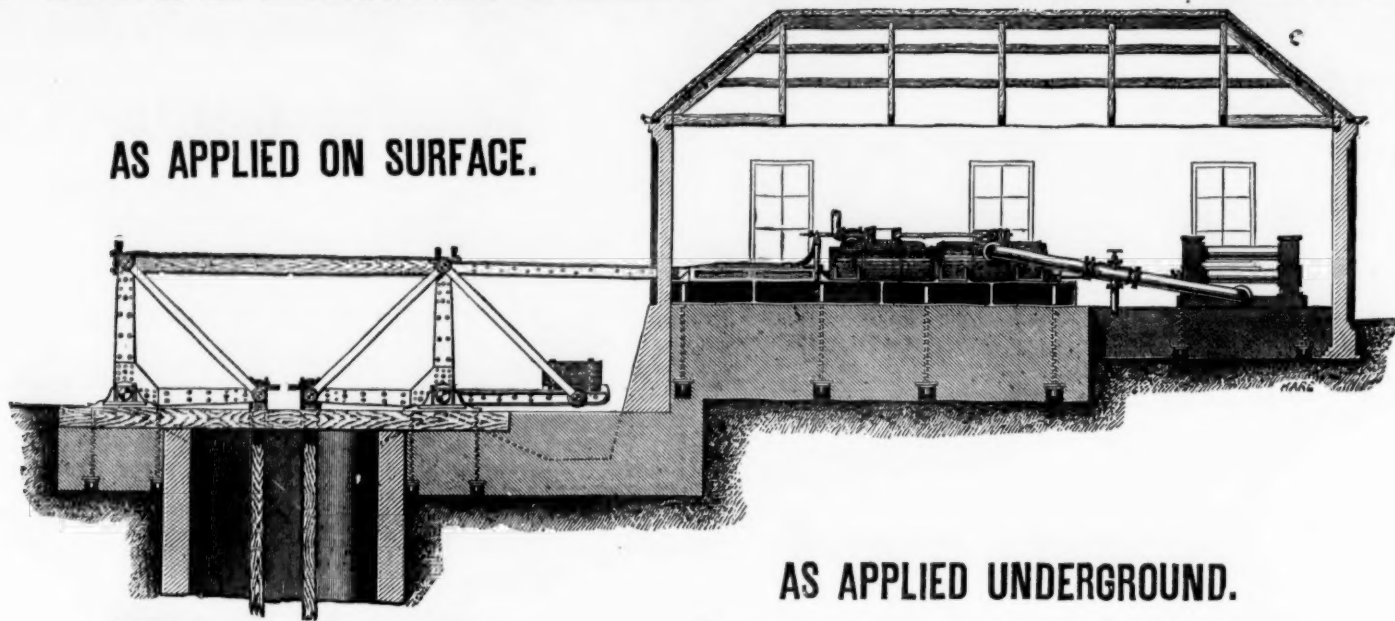
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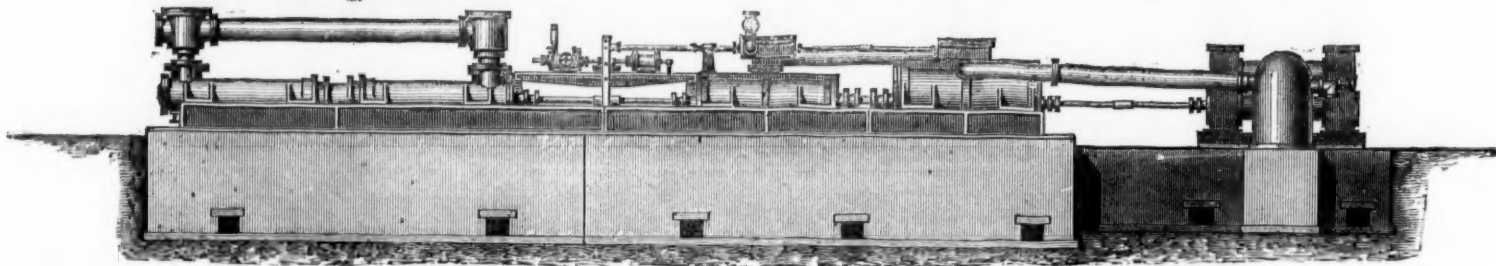
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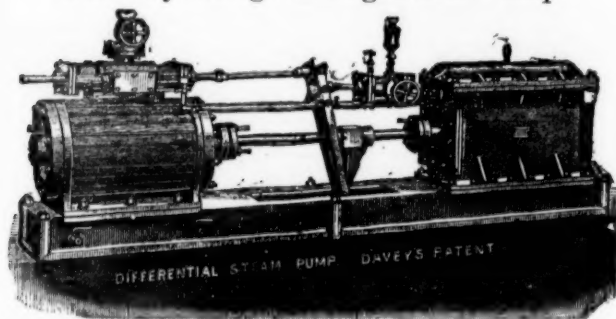


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10	9	15	17,300	70	85	100	120	6 1/2	1 1/2	2 1/2
12	6	24	6,500	250	90	104	130	4 1/2	2	2 1/2
12	7	24	10,500	180	96	110	136	5	2	2 1/2
12	8	24	13,500	140	100	114	142	6	2	2 1/2
12	10	24	21,300	90	120	136	175	7 1/2	2	2 1/2
14	7	24	10,400	250	110	130	156	5 1/2	2 1/2	3
14	8	24	13,500	190	120	145	165	6	2 1/2	3
14	9	24	17,300	150	130	150	172	6 1/2	2 1/2	3
14	10	24	21,300	120	140	162	190	7 1/2	2 1/2	3
14	12	24	30,800	80	160	190	216	9	2 1/2	3
16	8	24	13,700	250	140	170	195	6	3	3 1/2
16	9	24	17,300	200	150	180	215	6 1/2	3	3 1/2
16	10	24	21,300	160	160	196	225	7 1/2	3	3 1/2
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MINING ENGINEER.

ALEX. DEL MAR,

Mining Engineer, late Director of the United States Bureau of Statistics, Mining Commissioner for the United States Monetary Commission &c., 216, SANSOME STREET, SAN FRANCISCO.

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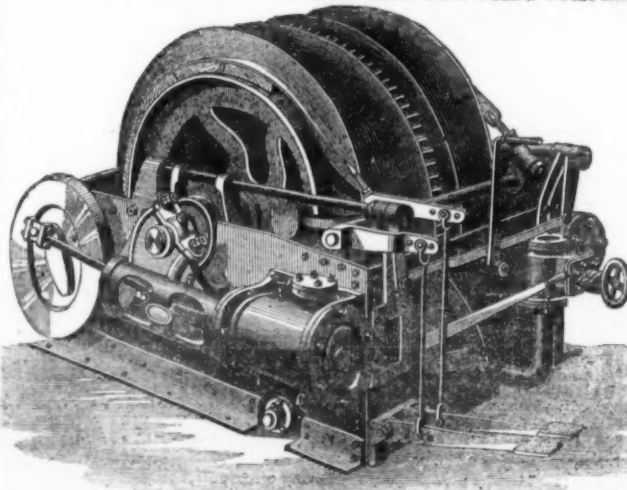
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This Advertisement appears fortnightly.]

SOUTH STAFFORDSHIRE AND EAST WORCESTERSHIRE
INSTITUTE OF MINING ENGINEERS.

The usual monthly meeting of members was held on Monday, at the Mining Museum, Dudley, Mr. W. FARNWORTH (the President) in the chair.

The minutes of the previous meeting were read and confirmed. Various communications received by the secretary—Mr. Alexander Smith, M.Inst.C.E.—were then read, and a unanimous vote of thanks passed to Mr. John Brown, C.E., for his donation to the library.

There were present, among others, Messrs. Henry Johnson, jun. (vice-President), Henry Johnson, sen., W. J. Hayward, A. Sopwith, D. Rogers, J. F. Addenbrooke, J. M. Fellows, and E. B. Line.

Mr. ARTHUR SOPWITH, M.Inst.C.E., then read the following paper upon the "Experiments made with Lime Cartridges at Cannock Chase Colliery."—According to promise, I have prepared in a tabulated form the results of the lime process as tried at the Cannock Chase Collieries. It was my intention simply to have given any necessary verbal explanation, but for the sake of conciseness and in view of possible absence I have thought it as well to write down a few notes. It must, therefore, be understood that the following remarks are not intended to deal with the subject generally. Had the trials been of a more extended nature, so as to lead to more definite conclusions, it would have been interesting, and, perhaps, of more value if the results had been closely compared with experiences in other districts, and so have entered fully into the matter. It is, however, intended to enter upon a more prolonged series of trials, and there will then be a better opportunity of dealing with certain points which still remain open to conjecture. Meantime it is probable that members of this Institute may wish to have some definite idea as to the general results of the trials (which necessarily admit of approximate conclusions being formed), and as the trials, on the whole, have been fairly successful as preliminary experiments, I have the least hesitation in making them public. It is unnecessary to enter upon a description of the drilling gear, cartridges, or pumping apparatus; these, together with the *modus operandi*, have been already given in considerable detail. It will easily be understood that it is impossible to base a sound judgment upon a limited number of trials. If a good fall be obtained over a certain length of face, operated upon by any process, it by no means follows that the next "drift" would give similar results, and this remark, owing to frequent local variations, applies particularly to the Cannock Chase seams. In making a comparison between lime and powder, an estimate must, therefore, be made in the latter case, and such estimate must be based upon the average amount of coal brought down, and thus the fall in the case of an isolated experiment may be effected in a portion of the line of face where powder would have given results above or below the average. The only way to arrive at a definite and thorough reliable result would be the continuance of trials over a period of some weeks and along a considerable length of face, comparing the results with similar length of face worked by powder during a corresponding time. Out of the six trials made at Cannock Chase only two were made under approximately similar conditions, and it is evident that the best and most economical could, with such limited experience, only have been accidentally arrived at. To illustrate this—in the first trial (witnessed by some members of the Institute) the holes were placed only 3½ ft. apart; in the following trial in same seam and district they were 4½ ft. apart, and the coal came down in approximately equal bulk in the latter case in 50 minutes, as compared with 75 minutes in the former. It is quite possible a greater margin might have been left between holes and also less time allowed for coal to stand on the sprags. Another important consideration which, applied to trials I and 2, and more particularly to No. 1, was that the powder holes would have been put in much further than the lime cartridges—the limited length of the drilling gear, &c., prevented the trial of larger holes. With an undercutting 6 ft. in (which is the ordinary holing in the shallow seam) it is probable that better results might have been obtained, even with the 3 ft. 3 in. holes, and very probably so had longer holes also been put in.

As a set-off against these conditions, which tend to the belief that the most economical results were not obtained, it may be mentioned that the coal was trimmed up square near the roof so as to enable the full advantage to be got from the holes, which would from the overhanging of the coal otherwise have reached a less distance into the body of the coal. Again, a cutting was made so as to form a

loose end. It by no means follows, however, that the above extra work is absolutely required, indeed there is good reason to believe that if special gear be adapted to suit the seam there will be no occasion for such work. For the purpose of the present, beyond pointing out the reasons why more satisfactory results may be expected, it is needless entering upon conjecture as to possible results, and it must be assumed that the trials are fair standards to take. It may be necessary to point out some conditions which affected the other trials, but this will be done in dealing with the trials *seriatim*. The first and most important point is, of course, the question as to the bringing down of coal, as any uncertainty upon this point nullifies the value of any details as to the cost of getting, &c.

Trials 1 and 2 were made in the shallow seam. No. 2 was in a section of face rather softer than No. 1, which was in a specially sound and hard piece of coal. In both cases, however, there was the bad parting to contend with, which is common to the seam. Under the hard coal forming the roof of working are 7 or 8 in. of very bright coal, and this adheres to the hard, so that it has frequently to be dressed off with a pike after firing of shots. Without being able to give any standard of comparison, it must be considered as a bad parting. Notwithstanding this the coal was brought down in a satisfactory manner, quite as much so as by powder.

No. 3 was a complete failure, attributable to two circumstances. First, some of the holes actually entered the roof; secondly, the water pumped in found its way back to some extent. The roof of the Yard Coal is very soft, and the expansion of the lime cartridges was entirely in that direction; in fact, they bedded themselves in the roof. Curiously enough this seam was the one judged by myself and others as likely to give the best results. There is little reason to doubt that if the holes were put in a little lower, so as to leave a shell of coal between them and the roof, the coal would be brought down, but it is uncertain whether it would leave a little coal next the roof which would have to be dressed down.

No. 4 was very satisfactory, and from the fact of the holing being the same as for powder a better comparison could be made. In this case the coal was certainly left longer on the sprags than was necessary, but their time being limited the men had to leave to prepare for No. 5 trial. Judging from the working of the coal 30 minutes would have been ample. The parting in this seam (deep) under the roof coal is very good compared with the shallow parting alluded to.

No. 5.—This trial was a partial success only, but it was different from the others, the lime having to act as a lifting force. The result, however, although not equalling powder, was better than anticipated. There were two drawbacks, one of which must be taken as common to all "bannocking" buttocks. In rising powder it is usual to put in a shot at the buttock end, inclining the whole, so that the end touches the floor. In order, however, to get the full advantage of the lime, it is necessary to put them in line of face. In the former case the powder causes a break at back, and has a tendency to throw the coal off in a block. In the latter case the full advantage can only be got when the coal is being worked "plump air." In trial No. 5 the seam was being worked "half end." That the lime should have supplied 11 tons is a striking proof of the power exerted. Considering the slow action of the lime, and the consequent making of less slack, in most cases the fact that there was more in this case appears somewhat anomalous at the first sight; but the conditions under which the coal is blasted by powder are more favourable as compared with "holed" coal. There is reason, however, to assume that the extra amount of slack made by lime was not purely owing to accidental circumstances. The reason for there being more slack is, that a layer of coal below the level of holes had to be taken up afterwards, and it was not displaced.

No. 6 was another complete failure, but this was made in a head. There was, in this case, a considerable leakage of water. The lime cartridges remained in all night, and were not increased in bulk. A general analysis of the foregoing leads to the conclusion that for bringing down coal in a long wall face which is undercut the process is successful. Out of four experiments only one was a failure, and this, as explained, is to be accounted for. It would be manifestly unfair to condemn the process, so far as getting coal in a head is concerned, by the failure of one experiment. As well might powder be condemned if the result were a "fast" shot. As to displacing bannocked coal, the question must also be left open.

ECONOMY OF THE PROCESS.—This may be divided into three heads.—1. Direct cost of getting coal as compared with powder.—2. Delay in bringing down coal.—3. Proportion of slacks. A refer-

ence to the table shows that the difference in cost between powder and lime is very trivial. In No. 1 trial there is a difference of one halfpenny in favour of powder; but in other cases there is a curious equality, so much so it may be as well to mention that the estimates for powder were given by different men, and the costs only worked out after all the data had been collected. In the case of No. 3 trial, allowing that the lime had acted, it would have presumably brought down the same quantity of coal as powder—i.e., it would have worked off as well to the back as in other trials. Now the time occupied in drilling the holes was exactly 50 per cent. more than in the other seams, a delay resulting from the place being inconvenient for fixing the drill standards. Had the lime been the same as elsewhere the cost would in this case also exactly have equalled powder. One is fairly, therefore, justified in concluding that the cost of the lime process is practically the same as powder, where the coal is undercut. In the case of "bannocking," the cost is more by 1d. 1-10th, also assuming that lime had done its work in head the cost would have been more. In estimating the cost for lime no consideration has been paid to interest and depreciation upon extra cost of tools, the cost of bringing water, and other contingencies, but these may be taken as of small moment. Unfortunately, I have not heard any particulars of royalty, or what may mean the same thing—extra cost of tools, &c., supplied.

DELAY IN BRINGING DOWN COAL.—The time that the coal is allowed to stand on the sprags is of little importance in the face of the work, as the length operated upon need not be one-third or one-fourth the length of stall, and there is work to be done elsewhere.

PROPORTION OF SLACK.—There is no doubt that much less slack is made by the lime process than in blasting by powder, but there is great difficulty in arriving at the respective amounts in the case of single experiments. As the coal lies after being brought down there is a considerable difference, but in breaking up for placing it in tub it is impossible to arrive at any satisfactory conclusion. Even a prolonged trial would not necessarily furnish accurate data on this point, as the simple measure of slack as sent out of stall is only part of the question. There may be as much slack made by the lime process by the time coal is put into tubs; but the coal will undoubtedly be less shattered, and bear carriage without breaking in transit. A very striking instance of the making of less slack is evidenced by the following:—The bright coal under the hard coal in shallow seams is by the action of powder broken into pieces mostly the size of nuts, but when coal was sent to bank out of places where lime was tried larger pieces than I have ever noticed were more the rule than the exception. It must here be pointed out, however, that if the dressing up and cutting are really necessary a considerable amount of slack will be made.

In order to be a little more definite as to the value of coal brought down by the respective processes I have selected the data from No. 4 trial, which appears the most reliable. Taking the value of coals and slack—i.e., fine slack or screenings—at 6s. and 2s. 6d. respectively, I find that the difference would amount to 14d. in favour of the lime. How far the general average of the coal would be improved can only be with present experience an unreliable estimate. It is sufficient to say that the average value of coal will be improved. I have touched upon most of the points relating to the Cannock Chase experiments in a very general way no doubt, but as far as I am justified. There are several considerations, *pro* and *con*, that I have not alluded to, but they are more or less matters of conjecture. Before concluding I would allude, however, to two points which come indirectly in connection with the trials—the effect of the lime in spoiling the appearance of the coal, and the inconveniences attending its use in the confined passages of a mine. That both are to a certain extent objectionable cannot be disputed, but it is clear that such objections must be more or less common to all places where the process is used. As an individual opinion I do not think that the coating of the coal with lime will injure its marketable value, but the evil is sufficient to give rise to some difficulty when there is so much variety in the seams, and it requires practised hands to examine the certain portions. As to the other question, it seems a very great evil; how far it can be avoided by picking out the bulk of the cartridges has not been tried at Cannock Chase, and the experience gained is too limited to say whether the men are justified in answering it to be a material objection. Where rakes and baskets are used it is likely to be very unpleasant, and this can easily be understood when it is remembered that something like ½ cwt. of lime is used in a length of 16 yards, or (say) 1 ton of lime for each 1000 tons of coal. The exact amount is 0.10 per cent.

ANALYSIS OF EXPERIMENTS WITH LIME CARTRIDGES AT CANNOCK CHASE COLLIERY, SEPTEMBER, 1882.

LIME.	EXPERIMENT I. No. 3 Shallow.	EXPERIMENT II. No. 3 Shallow.	EXPERIMENT III. No. 2 Yard.	EXPERIMENT IV. No. 2 Deep.	EXPERIMENT V. No. 2 Shallow.	EXPERIMENT VI. Shallow Head.
Length of face	15 yards.	15 yards.	9 yards.	9 yards.	7 yards.	6 ft. 9 in. ¶
Number of holes drilled	10	9	5	5	4	3
Distance of holes apart	3 ft. 6 in.	3 ft. 6 in.	4 ft. 6 in.	4 ft. 9 in.	4 ft. 6 in.	3 ft. 6 in.
Depth of holes	3 ft. 3 in.	3 ft. 3 in.	3 ft. 3 in.	3 ft. 3 in.	3 ft. 3 in.	3 ft. 3 in.
Diameter of holes	3 in.	3 in.	3 in.	3 in.	3 in.	3 in.
Distance of holes from roof	2 in.	2 in.	Nil.	Nil.	Nil.	1, nil.; 2, 2 ft.
Depth of holing	4 ft. 0 in.	4 ft. 0 in.	3 ft. 6 in.	4 ft. 0 in.	5 ft. 0 in.	5 ft. 0 in.
Thickness of coal	5 ft. 9 in.	5 ft. 0 in.	3 ft. 6 in.	5 ft. 2 in.	7 ft. 0 in.	6 ft. 6 in.
Thickness of coal above holing	4 ft. 10 in.	4 ft. 2 in.	2 ft. 0 in.	3 ft. 9 in.	5 ft. 10 in.	5 ft. 10 in.
Time taken to drill the hole (including fixing of drills, &c.)	16 minutes.	10 minutes.*	—	—	18 minutes.	30 minutes.
Time taken to charge the hole	8 minutes.	—	—	—	8 minutes.	7 minutes.
Time taken to drill and charge all the holes	4½ hours.	3½ hours.	3 hours.†	2 hours.	2 hours.	1½ hour.
Time taken to charge holes with water	5½ minutes.	5½ minutes.	3 minutes.	3 minutes (nearly).	3 minutes.	2½ minutes.
Amount of water in each hole	3½ pints.	3½ pints.	3½ pints.‡	3½ pints.	3½ pints.	2½ pints.**
Number of cartridges	67	—	—	—	—	3 ft.
Size to which the holes swelled	4 in.	4 in.	3½ in. §	4 in.	3½ in.	18 hours.
Time the coal was left on sprags	1½ hours.	50 minutes.	22 hours.	1½ hour.	3½ in.	18 hours.
Amount of coal brought down	29 tons 14 cwt.	24 tons 15 cwt.	None.	15 tons.	11 tons 4 cwt.	None.
Amount of slack brought down	Scarcely any.	Scarcely any.	None.	5 cwt.	1 ton 4 cwt.	None.
POWDER.						
Length of face required to bring down a quantity of coal equal to that brought down by lime	11 yards.	13 yards.	9 yards would yield 12 tons.	9 yards.	5 yards.	6 ft. 9 in. would yield 5 tons.
Number of holes required and depth	3 ft. 6 in. deep.	4 ft. 5 in. deep.	4 ft. 3½ in. deep.	4 ft. 4 in. deep.	1½ ft. 5 in. deep.	2 ft. 5 in. deep.
Depth of holing required	6 ft. 0 in.	5 ft. 0 in.	4 ft. 0 in.	4 ft. 0 in.	1½ ft. 5 in. deep.	5 ft. 0 in.
Time taken to drill and charge all the powder holes	1 man, 5 hours.	1 man, 5 hours.	2 men, 2 hours.	2 men, 2 hours.	1 man, 1½ hour.	1 man, 1½ hour.
Amount of powder used in each hole	1½ lb.	1 lb.	1½ lb.	1½ lb.	1 lb.	1½ lb.
Cost (Drilling holes, &c.)	5 hours at 6d.=2s. 6d.	5 hours at 6d.=2s. 6d.	2 hours at 6d.=2s. 6d.	2 hours at 6d.=2s. 6d.	1½ hour at 6d.=9d.	1½ hour at 6d.=9d.
Cost of powder	3½ lbs. at 8d.=2s. 6d.	4 lbs. at 8d.=2s. 6d.	1½ lb. at 8d.=0s. 11d.	1½ lb. at 8d.=0s. 11d.	1½ lb. at 8d.=0s. 11d.	1½ lb. at 8d.=0s. 11d.
Cost of lime	6 yards at 1d.=0s. 6d.	7 yards at 1d.=0s. 7d.	5 yards at 1d.=0s. 5d.	5 yards at 1d.=0s. 5d.	2 yards at 1d.=0s. 2d.	3 yards at 1d.=0s. 3d.
Cost (Drilling holes, &c.)	4½ hours at 6d.=2s. 6d.	3½ hours at 6d.=2s. 6d.	3 hours at 6d.=2s. 6d.	2 hours at 6d.=2s. 6d.	2 hours at 6d.=2s. 6d.	1½ hour at 6d.=2s. 6d.
Cost of lime	10 holes at 3d.=2s. 6d.	9 holes at 3d.=2s. 6d.	5 holes at 3d.=2s. 6d.	5 holes at 3d.=2s. 6d.	4 holes at 3d.=2s. 6d.	3 holes at 3d.=2s. 6d.
Cost per ton with powder	2s. 6d.	2s. 6d.	2s. 6d.	2s. 6d.	2s. 6d.	2s. 6d.
Cost per ton with lime	7s. 9d.	9d.	9s.	9s.	—	—
Total cost of getting with powder (including holing, &c.)	7s. 9d.	8s. 9d.	10d.	9s. 2d.	—	—
Total cost of getting with lime	—	—	—	—	—	—

* After fixing. † Not much room in face. ‡ Some escaped owing to bad ramming. § In roof. ¶ Bannocked. ** With one cutting. *** Some escape.

INSTITUTE OF MECHANICAL ENGINEERS.—A meeting of members was held on Friday, at Manchester, Mr. P. G. B. Westmacott, President of the Institution, in the chair. The Secretary (Mr. W. R. Browne) read a paper on the Fromentin automatic boiler feeder, which had been written by Mr. John Hayes, of London. Mr. Hayes described the construction of the feeder, and stated that it was perfectly automatic and maintained the water in the boilers at a constant level, thus rendering the boiler far safer to work, whilst it also tended considerably to economise fuel, and increase the durability of the boiler. A paper on the automatic screw brake, by Mr. W. Parker Smith, of London, was next read. After a description of the apparatus, Mr. Smith stated that with this system the brake was normally on; so that a coach fitted with this apparatus could not be moved in either direction through its own length unless the lever was lifted and held up. Similarly, unless the continuous connections are perfectly made along a train, the levers could not be lifted, and consequently the train could not be started. Any portion of the train that by an accident became detached would, by the automatic application of the brake, be brought to rest. The movement by which the brake power is applied, released, or graduated in amount, was made with ease and celerity; nor was there any appreciable time lost between the fall of the weighted lever and the application of brake pressure. From two to three revolutions of an axle were sufficient to put the brake fairly on. It had been claimed by the advocates of compressed-air brakes that the full brake action was obtained by the flow of

air at high pressure, at 1½ sec.; and they contrasted this with the 10 secs. stated to be required before full pressure was applied by vacuum brakes. But even 1½ sec., at a speed of 60 miles an hour, meant an advance of the train through 110 ft.; whereas two or three revolutions of an axle represented an advance of but 20 and 30 ft. respectively. The brake pressure might be retained for any length of time—an important consideration in descending long and steep gradients—while it could be taken off by the driver or guard at any moment if required.—A paper by Mr. Waldemar Bergh (London) was also read. A discussion took place at the close of each paper, and the proceedings concluded with a vote of thanks being accorded to the Chairman.

ANNEALING METAL PLATES.—An improved arrangement of the furnace fittings and apparatus connected therewith for annealing metal plates, more especially with reference to plates in the tin plate manufacture, although applicable to annealing other metal articles—glass, pottery, or the like—has been invented by Messrs. BOWEN and JENKINS, of Morriston, Glamorgan. Their main object is the more equal diffusion of heat over the annealing pots or vessels, so that they may become more evenly, and, at the same time, rapidly, heated throughout, thus securing more effective annealing, and also preventing the pots or vessels from being damaged by unequal heating. To obtain this end they enclose the ash-pit with a door or doors, and dispense with the natural draught, but

use an artificial draught instead. For promoting the draught they employ a fan, steam jet, or any other convenient blower, and to make the furnace self-sustaining as to draught, they advantageously place a boiler in any convenient position between the furnace and the smoke-stack, so that the heat after doing its work in the annealing furnace or oven may raise steam to work the blowing apparatus. It is obvious that the artificial draught may be supplied independently. In the smoke-stack there is placed a damper by the regulating of which, together with the draught the desired effect of a general and nearly equal temperature throughout can be secured. It will be apparent that these furnaces can be used for calcining ores and other matters, the details being modified accordingly.

NEW SAFETY LAMP.—The invention of Mr. JAMES CUNLIFFE, of Walkden, consists in the use of a glass cylinder, of the size and thickness at present in use in colliers' lamps, having an opening extending down the whole length of the side of such cylinder. The width of this opening is not material, but by preference should not exceed one quarter of the circumference of the glass cylinder. This opening is filled in with the ordinary wire gauze, and thereby allows of the admission of air to the flame, and also for the expansion of the glass cylinder when heated. He also closes up the top of the cylinder with wire gauze, thereby dispensing with the ordinary cylinder of wire gauze above the glass, which cylinder of gauze is capable of resisting a current of explosive mixture on account of the liability of

the flame to be blown through. He claims that his opening down the side of the glass cylinder, combined with the wire gauze covering on the top of the glass cylinder, enables his lamp to resist such current of explosive mixture, because the flame can never be forced either through the wire gauze top or through the lateral opening. His invention enables the lamp to be readily moved about without fear of the flame being extinguished. Several improved safety lamps have been found to fail on this account. In other respects his lamp resembles those at present in use.

MANCHESTER GEOLOGICAL SOCIETY.

The first of the series of meetings arranged to take place at Wigan during the present session in connection with the Manchester Geological Society was held on Friday, Nov. 3, the Council Chamber in the Municipal Buildings being placed at the disposal of the members. In the absence of the President, Mr. J. L. HEDLEY, Inspector of Mines, occupied the chair, and the various matters brought forward for discussion related exclusively to questions connected with mining.

THE MEASUREMENT OF AIR CURRENTS IN MINES.

Mr. JOSEPH THOMPSON read a paper on the above subject. There ought not to be, he said, and presumably there was not, anything within the range of practical applications of science which commended itself more and was of greater interest to those engaged in and who were responsible for the good management of our coal mines, than a consideration of such appliances as were calculated to impart useful information for their guidance bearing upon the safety of life and property. Amongst the numerous sources of anxiety inseparably connected with coal mining there was probably none which so much exercised the minds of colliery owners and officials as that of ventilation. The possibility of the occurrence of an explosion was a matter of far too serious a nature to be in any way lightly considered; hence it was that during recent years particularly there had been no unsparing provisions of capital on the part of colliery proprietors for the establishment of the most efficient appliances for producing the enormous volumes of air now passed through the mines. In an abstract sense it might perhaps be stated that by establishing such powerful means of ventilation the duty of the mine owner had been abundantly discharged, and that at this point the duty of the officials began, in seeing that the useful effect intended by the erection of these appliances was constantly attained. It could not, indeed, be refuted that one of the most important functions of a colliery manager, in a general sense, was a careful observation of the operations of such forces as were known to have a tendency to influence the quantity or volume of air in circulation within the mine. The barometer, thermometer, hygrometer, and water-gauge were consulted respectively, in order to ascertain the conditions of pressure, temperature, moisture, and resistance, and an anemometer was used in reference to quantity of air. For immediate purposes the indications of the anemometer were of the highest importance, its duty being to indicate effect, the study of the other instruments being concerned with the explanation of cause. It was, therefore, ground for great regret that the anemometer was, as a rule, the least reliable in its indications of any of the instruments in use. The indications of most of the forms of anemometer he had seen used in mines must be regarded as very equivocal, and, consequently, of an unsatisfactory character. The task of making observations was one, moreover, which was attended with some labour, and not reasonably practicable to be performed with that ease and frequency which under more favourable conditions might be considered desirable, and much greater scientific value would attach to observations of all instruments if these observations were made simultaneously at fixed periods during each day; but before such could be possible it was manifestly necessary that some superior form of anemometer must be adopted, and the observations of its indications rendered as easy as were those of other instruments. This being done it would be possible by day or night to obtain a perfect knowledge not only of the operations of the natural forces which affected ventilation but also of the actual amount of air circulating in the mine by the expenditure of a few minutes' labour. The importance, in a practical sense, of being constantly able to indicate in the office at the surface the quantity of air passing through a mine, and, in a scientific sense, of the simultaneous system of making all observations, could not be exaggerated. The late Mr. Wm. Pease, of Haigh Colliery, was alive to this question 25 years ago, and designed an ingeniously constructed anemometer which indicated on the surface. Others had interested themselves since that time in the same direction, but none, so far, had secured sufficient favour to receive general adoption. Various causes could be stated as accounting for this; but with the increasing concern which science in its modern form of development took in mining matters, and the increased responsibility imposed upon mine owners by recent legislation, there was a constantly growing necessity for increased watchfulness in all respects, and particularly on the important question of ventilation. The means which he should propose for indicating at one point the velocity of the air current at some other point, was not the result of any new and important discovery. It was simply an adaptation or combination of already well-known principles. In the first place he adopted the use of what in meteorological circles were well known as Robinson's cups, which consisted of four hemispherical metal cups with their sides all turned the same way and mounted at the extremity of two arms, crossing at right angles and fixed upon a vertical axle. When these were erected the wind acted upon the concave sides presented to it and set the whole in motion, and the speed of the cups always bore the same proportion as that of the wind. These cups had a train of wheels converted with the axle to register in miles the wind that had passed over them, but instead of a clockwork arrangement he would cause every revolution made by the cups to break an electric circuit, to the scope of which there was, of course, no practical limit. This could be accomplished by a simple mechanical arrangement, and a small dead-beat hammer upon a surface of porcelain or glass at the observing station would be actuated at each revolution of the cups. The apparatus would also be so constructed as to be completely free from electric influences except during the short period occupied in making observations. The number of beats given by the hammer in a specified period would record the true velocity of the wind in the mine, and the superficial area of the cups being known there would also be a correct indication of the number of cubic feet of air passing at the same time. The electric current would also permit the establishment of a number of observing stations, and in the absence of such stations below ground it would be generally found practicable by counting the revolutions of the cups to form some general comparative estimate of the quantity of air passing. The method of the erection of the cups at selected stations within the mine was a matter which would obviously be governed by circumstances, but the small space occupied by the apparatus would involve no serious difficulty in any case. Considering the constant liability to change in matters affecting the efficiency of the ventilation of mines, the usual reports as to the state of ventilation of the previous day were of little practical value, the important question being the ability to ascertain what was going on in the mine at any moment, and the apparatus he had described would meet such a requirement. It would also enable a constant check to be kept upon the operations of the fan-minder or other ventilating apparatus man, and it was less likely to get out of order than most other forms of anemometer.

On the motion of Mr. W. TOPPING (Wigan), seconded by Mr. W. BRYHAM, jun. (Wigan) a vote of thanks was passed to the reader of the paper.

The CHAIRMAN asked if the apparatus had been in actual use in a mine?—Mr. THOMPSON said the cups were in use at nearly all the Board of Trade stations in the kingdom, but he did not think they had yet been used underground.

The CHAIRMAN suggested whether it was not very likely that the action of the cups might become clogged by the dust in a mine; when they were in the open air they were, of course, not liable to the same amount of dust.

Mr. J. THOMPSON said there was no risk of the bearings becoming clogged, and the bottom of the apparatus was so constructed that it would be constantly ventilated.

The discussion on the paper was adjourned to the next meeting in Manchester.

THE MECHANICAL VENTILATION OF MINES.

Mr. CHARLES COOKSON, M.E., who, at the June meeting, read a paper on "Centrifugal Fans, their Relative Efficiency and Useful Effect," reintroduced the discussion of the subject. After giving a résumé of his paper, Mr. Cookson urged the advantage of centrifugal ventilation for the large volumes of air now required in mines in preference to the varying capacity mechanical means, and expressed the opinion that the Guibal fan, which had been found in Germany to give upwards of 70 per cent. of useful effect, was the best apparatus yet constructed.

Mr. C. M. PERCY (Wigan) who had prepared diagrams of the three well-known centrifugal fans, the Guibal, Waddell, and Schiele, said he looked upon the paper as a very important one, and Mr. Cookson had displayed so much ability upon the subject that he hesitated to offer any opinion in opposition to the paper. He agreed with Mr. Cookson that the practical results obtained from the various fans were so contradictory that one almost lost hope of expecting to arrive at any definite decision as to which was the best by mere experiment.

The conditions of different mines varied so much that the results were obtained under widely varying conditions, and were therefore not an accurate test of the capacity of the three fans. He certainly, however, did not agree with Mr. Cookson that the Guibal was so much better than the Schiele and Waddell fans. His (Mr. Percy's) opinion was that the Guibal fan was wrong in construction for two reasons. The blades were constructed in a most contradictory manner; they were inclined backwards and then curved forwards, and it appeared to him that either the backward incline was right and the forward curve wrong, or *vice versa*. As the direction of the air has changed, it must have an injurious effect upon the ventilation. Then the air could only make its escape at one part of the fan, and this was a disadvantage. The expanding chimney was right, but he did not quite follow Mr. Cookson when he said that the expanding chimney stored up the work of the fan; he believed that it would allow the air to escape with less resistance, but he did not think it would have much influence in storing up work. He had taken a great interest in the Waddell fan, which he had regarded as having all the appearance of a correct fan, but there was no question that the results obtained had not been so satisfactory as with other fans. With regard to the three fans before them he held that the Schiele was constructed on the most correct principles. It was correct in the first place because it was a small fan, and if they could do the work with a small fan it would certainly be a mistake to use a large one. The spiral casing was also correct, and further it was correct because the blades were carried backwards at the tips.

Mr. COOKSON, in reply to Mr. PERCY, contended that the construction of the blades in the Guibal fan was correct; for the Guibal the shape of blade adopted was right, whilst in the Schiele the shape of blade adopted was right for that particular fan. The Schiele was practically an open running fan, and it only gave the water-gauge which any other ordinary running fan would give; the Guibal, on the other hand, gave a much higher water-gauge. If they had a perfectly straight blade in the Guibal fan this would tend to baffle the air at its entry. With regard to the air only escaping at one part of the fan, he contended that plenty of space was allowed, and the opening could be properly adjusted from the requirements of the mine. Of course if they made the Guibal into an open running fan they would not be able to get so good a water-gauge. He still maintained that the Guibal was the best fan, and superior to an open-running fan.

Mr. W. J. GREENER (Pemberton) said the only experience he had of fans was in connection with the Pemberton Collieries. They heard a great deal about the relative efficiency of these fans, but in his opinion a great deal of money was sometimes spent upon a fan, whilst not sufficient attention was paid to the underground department in keeping the air-ways clear and large enough. The result was that frequently after a fan was put down the colliery owner was disappointed.

Mr. W. TOPPING (Wigan) suggested whether it might not be possible to work with duplicated small fans instead of one large fan. He did not express the opinion that it was possible, but it might be found that equivalent results could be obtained with two small fans as with one large one.

On the motion of Mr. PERCY, seconded by Mr. HILTON, it was decided to allow the subject to stand over for further consideration.

SAFETY LAMPS FOR MINERS.

The real question before the meeting was with reference to safety lamps for miners, and the tin-can lamps exhibited by Mr. Hall, Inspector of Mines, at the last meeting of the society held in Wigan.

Mr. TOPPING, in answer to a question, said that since the last meeting the tin-can lamps which he was then using had given perfect satisfaction, and he had now established the same system of lighting in another mine. He might add that he intended to use the tin-can lamps exclusively, because he was so satisfied of their safety.

Mr. LONGBOOTHAM, of the Norley Coal Company, Orrell, said that, in his opinion, the lamp was absolutely safe, but he would suggest that the further discussion of the matter should be adjourned for the present, because they had just then a difficulty on with their men with reference to the use of the tin-can lamps. The men did not allege that it was not safe, but that it gave less light than the other lamps. Any one, however, who would inspect the lamps he had brought to the meeting would be able to satisfy themselves whether they gave less light. He thought, however, that a discussion at the present time of the merits of different safety lamps might only tend to create still further misapprehension in the minds of the men.

Mr. GREENER seconded Mr. Longbootham's suggestion, as he believed it would be undesirable to discuss the question at that meeting.

The suggestion was agreed to, and the proceedings closed with a vote of thanks to the Mayor of Wigan for granting the use of the Council Chamber.

THE MINERAL RESOURCES OF IRELAND.—We are glad to be informed that Capt. AYLMER, M.P., has given notice to move an address for a Royal Commission of Enquiry into the industrial resources of Ireland. We learn also that he has recently been on a visit to Capt. Thomas and the mineral districts of West Cork.

COAL IN GERMANY.—The coal production of Germany (according to the Württemberg Gewerblatt) has so enormously increased within the last two decades that there is reason to fear an exhaustion of the beds at no very distant date. While the production of England in that period has risen from 85.4 million tons to 149.3 million, that of France from 8.3 million to 19.4 million, that of Belgium from 9.6 million to 16.9 million, the German yield of coal has increased from 12.3 million to 59.9 million—a proportion reached approximately only by North America, which shows a rise in production from 15.2 million to 70.3 million tons. Considering that the coal fields of Belgium comprise about 900 square miles, those of France 1800, those of Germany 3600, those of England 9000; and comparing with these the vast coal fields of the East Indies (35,500 square miles), North America (193,870 square miles), and China (over 200,000 square miles), the question of so improving means of international traffic that the small cost of transport may render possible a continuation of industrial work on European soil even with foreign coal, becomes (in the opinion of the writer referred to) most important.

LETTS'S DIARIES.—There are probably no diaries more widely adopted than these, and as they are issued in no less than 397 different forms the intending user must indeed be difficult to please if he cannot find one of these adapted to his taste, especially as they vary in size from that of a gentleman's card case to that of a family Bible, and in price from 6d. to 5s. The series for the office contain valuable printed information, especially relating to our postal, banking, telegraph, and Parliamentary systems, not to be found elsewhere without great research and trouble; and the scribbling and pocket diaries are prepared with equal care to meet the wants of the

purchasers. The editions for the coming year, just issued, are fully equal to their predecessors.

Original Correspondence.

A TRIP TO COLORADO—No. V.

BY THOMAS CORNISH, M.E.

Author of "Gold Mining, its Results, and its Requirements."

The great Mining Exposition at Denver is indeed a grand and imposing sight, containing, as it does, a marvellous display of mineral wealth from the State of Colorado, as also from the neighbouring States and territories, including the States of Arizona, New Mexico, Utah, Wyoming, Nebraska, Nevada, Idaho, Montana, Dakota, Texas, and others. To do justice to the several States in giving an outline of the value and resources of their mineral wealth, as also the display of agricultural products and the specimens of manufacturing industry, would require more time and research than I had to spare. A general examination of the various stands in the Exposition building, as specially represented by the several counties of Colorado, impresses the beholder with wonder and astonishment as to what must be the future of that State, so young in years and yet so far advanced in the development of its mineral resources within the few years since the first discovery of its gold and silver mines. The history of the rise and progress of Denver, Leadville, and many other mining cities and camps amongst the Rocky Mountains, and an examination of the products of the various mines within the extensive districts as represented by the exhibits, would, if full justice could be done, read more like a fairy tale or an exaggerated "Arabian Nights" story, and the narrators would, no doubt, be accused of drawing deeply on his imagination. But facts are stubborn things, and verified statistics of the production of gold and silver from the mines, with reliable information as to population in the various cities and towns, the maps showing the position and extent of mineral country already prospected and partially developed, with the practical evidence of the wealth of the districts represented in the Denver Exposition, holds forth such bright prospects of future prosperity as probably no other State or similar sized area of country can offer.

The Rocky Mountains traverse the State of Colorado from north to south, a distance of about 250 miles in length, and extending over an immense width of mineralised country, varying from 100 to 200 miles. Each county or district has its special features and advantages fully set forth in the Exposition, and in many instances elaborate reports, statistics, and plans to enlighten the visitors have been prepared. The commissioners who have been selected to represent their districts are most assiduous in their efforts to instruct those desirous of information as to the peculiarities and values of the ores displayed at the separate stands. There has evidently been a pleasant and commendable rivalry amongst the various commissioners as to who could make the best display of ores, and set-off the exhibits to best advantage. Energy in making the collections of samples, and taste in arranging them for view, may be accorded to all. The National Mining and Industrial Exposition is, I believe, the first of its kind held in America. There has been some excellent displays of gold and other mining products in Australia at the Industrial Exhibitions in Melbourne and Sydney, but nothing approaching the gigantic display made at Denver, which from the great success attendant on the efforts of its promoters, must surely have satisfied their most sanguine expectations.

The States and territories of Colorado, Nevada, Arizona, New Mexico, Utah, Montana, Idaho, Dakota, Wyoming, and Nebraska are well represented by the magnificent display of mineral and other products selected from a vast tract of mineralised country of about 1,000,000 square miles of territory, the whole forming such a display of hitherto "hidden earthly treasures" that the world has never before had the opportunity of seeing concentrated under one building. The Exposition of Mining Machinery is also of great interest, and represents a collection of the principal classes and varieties now in use, and, taking it altogether as a "Great Mining Exposition," credit must be given to the projectors for having produced the grandest display of mineral wealth the world has ever seen. From all the great mining States of the west Colorado is the most extensively represented, which might naturally be expected, as the enterprising spirits who have developed their vast resources inaugurated the scheme which has crowned their efforts with success. The various mining districts of this State, being for the most part within easy access of railway accommodation, had better facilities for making a large collection than the neighbouring States.

Lake County, of which Leadville is the capital, has the largest display of silver ores, containing an immense variety in every form they occur in the carbonate city. Not only is the ore shown in massive lumps, as raised from the mines, but some of the rich companies have exhibited models in monument form showing the amount of solid bullion they have produced since they have been in operation.

Gilpin County, although the smallest in the State, has the grandest display of gold ores, and the great gold belt of Colorado has contributed the most extensive and characteristic exhibition of its immense mineral wealth, as can be seen in the collection. The enterprise and taste of the Commissioner, Capt. Manning, in arranging and fitting up the magnificent display of ores is a general theme of comment by visitors attending the Exposition, and the Gilpin County show may be termed the great attraction. Not only is every attention and information given to inquisitive visitors as to the resources of the county and the development of the mines, but "behind the arras" of the beautifully fitted up stand there is a hearty welcome and genial hospitality dispensed, occasionally graced by the presence of charming ladies, who vie with the sterner sex in according a kind welcome to visitors that renders a visit to the Gilpin County stand an additional attraction. The general arrangement of the ores is admirable, showing them to great advantage, much of it in massive lumps from 1 cwt. to 5 tons, fully representing its character and occurrence in the lodes, and sustaining the reputation the county enjoys of being the greatest fissure vein gold district in the State.

The total production of Gilpin County is represented by an obelisk standing in the main hall of the building. It has a silvered base of 59 in. high and 74 in. square, representing the bulk of over \$3,000,000 in silver. The shaft, or main column, is 17 ft. 6 in. high to base of top, and the top is 2 ft. high. The base of the shaft is 3 ft. square, and the top 2 ft. It is covered with gold leaf, and represents the bulk of \$35,000,000 in gold. The total gold and silver product of Gilpin County since 1859 is about \$38,500,000, with about \$2,000,000 in copper and lead. Gilpin's obelisk is a prominent object of attraction to the Exposition, and displays in a very practical form the immense wealth already produced in this small section of country, and the brilliant prospects of success that await those who energetically develop the resources of the district.

The smaller and very choice specimens of gold ore and pure gold are contained in handsome show cases, which give a nice relief and set off to the gigantic specimens displayed on the floor, making the most complete exhibit in the place, and representative of nearly 100 mines. The weight of the ores and specimens on view is 35 tons, and is valued at \$4500, or \$128 per ton.

The area of the gold belt in Gilpin County is about four miles in length by three in width, and within that space contains more valuable gold-bearing veins than any other known district of equal extent. The county is mostly granitic gneiss, but in places appears mica-schist, micaceous schist, coarse metamorphic granite, and porphyry. There are about 150 known approximately parallel lodes or fissure veins of proved value and distinctive character, many of them proved to great depths, as instanced by the Californian, now raising good ores at 1300 ft., and also the Hidden Treasure, Kansas, Kent County, the Gunnell, the famous Bobtail, which displays massive chunks of smelting ore, weighing over 900 lbs., the Tierny, with an enormous mass weighing several tons, and various others of well-known value.

I am pleased to notice that the outcome of the Exposition has been to establish a National Mining Association for advancing the mining interests, and that Gilpin County has received the honour of

having its representative, Capt. Thomas Manning, elected to be the first President, and whose address I have read with much interest.
New York, Sept. 29.

THE AFRICAN GOLD COAST SYNDICATE.

SIR,—May I be permitted to warn my fellow-shareholders in this undertaking against a circular which is being issued, bearing the signatures of three persons of whom we know absolutely nothing. On enquiry of the secretary as to the stake which these agitators have in the concern, he informs me that one of them holds five shares (10s. each), another one share, and the third two shares. This little fact, I think, is enough to enable any one to see through the wonderful disinterestedness of these individuals. The consummate assurance of the holders of the one and the two shares in coming forward to protect our interests, and bearing a part of the expenses connected therewith, is quite a treat. How kind of them to incur the cost of printing and postage of circulars; the prospective expenses of sending out further circulars and forms of proxy; the wasting of their valuable time in the correspondence which they invite, or in obtaining an injunction in Chancery—I say, how kind of them to do all this for nothing, and for the sole benefit of people whom they have never seen! Had they been large shareholders I could have understood the matter, as it would have been a question of saving their own money; but they cannot assign this as a reason in face of the fact that their holdings consist of a paltry one 10s. share in one case and two 10s. shares in the other. Before they have gone very far in this matter their expenditure in this agitation will exceed the value of their shares, and, no doubt, we are supposed to be simple enough to think that this is being done out of pure philanthropy, and without their having any ulterior object in view. It won't go down. Mr. Andrew Stewart, of Liverpool, one of the directors, has sent me a circular giving an emphatic denial to some of the statements contained in the agitators' manifesto.

I have, what is to me, a considerable stake in this syndicate, obtained in exchange for hard cash, but am not behind the scenes in any way, and have no bias in favour of the board, except in so far that I do not think that Commander Cameron (a man who has highly distinguished himself in his country's service, and whose name is a household word in English homes), would lend himself to anything that was not strictly upright and honourable. I would, therefore, ask my fellow-shareholders, if they wish to see our undertaking a success, to take no notice whatever of the circular which they have received. Depend upon it there is something more under the surface than we can just at this moment see.

X. Y. Z.

MYSTORY REEFS COMPANY, AND OTHER MATTERS.

SIR,—Noticing in the Journal of Saturday a letter enquiring about this company from "W. P. S." I think it may be of interest to reproduce so much as will explain itself a letter to me by the secretary under date of Nov. 3: "Negotiations are now pending which renders it rather difficult to answer most of your queries meanwhile." "In all probability you will receive a circular in a few days on the position of affairs." "The mines are, of course, stopped (*pro tem.*)" "The monthly expenditure is confined to the London expenses and the pay of the mechanics in India, of whom two are under notice to leave."

The remainder of the letter refers to an attempt to flout upon the poor shareholders of this company Olathe debentures (of which I believe Mr. Foakes is Chairman), and to the fact of Mr. Bonella's resignation as a director, and that the present directors are Messrs. Blair, Colonel Lindsay, and General Travers. All the shareholders are no doubt aware that Colonel Lindsay is, or was, the accredited agent of the actual vendors—Arbuthnot and Co. General Travers is, or was, I believe, connected with the Carta Para and Simon's Reef Companies—Chairman, I think, of one about which there is pleasant reading in Saturday's Journal. Winding up, minutes on loose slips of paper, and general harmony—most disagreeable reading to any right-feeling person. I further believe General Travers is not an original shareholder, and probably holds shares allotted to the vendor; and these gentlemen have taken the place of such men as Messrs. Harvey, Price, and Grey, and I will add Mr. Bonella, who paid cash for their shares without any consideration, holding about 12 per cent. of the whole *bona fide* allotted shares, and in the case of Messrs. Harvey and Co. individually I think four times any other individual holding, and this by the will of the shareholders! Verily the British investor deserves all he gets (as a rule)—loss. While speaking of this company I may remark that its experience as to fees does not agree with Messrs. Watson's remark in the Journal of Oct. 28, referring to something which had been said at Dolcoath. Only get an admiral, general, colonel, or a baron or a baronet, and merrily flouts the craft. In my opinion it is quite time the Public Prosecutor left "Speedwell Sewing Machines at 1s. 2d. each" to take care of themselves, and turned his attention to companies' promotion and conduct, as directors do not seem to attach any importance to the representations that are made—in effect to guarantee—by their names. * * * *—*Witness*, Nov. 7.

J. CLARE.

THE GOLD AND DIAMOND FIELDS OF SOUTH AFRICA.

SIR,—The British Diamond Mining Company holds, according to the plan, about 9300 square feet of good ground; but allowing for what has been cut out in depth their actual diamond producing area is about 6600 square feet, the whole of which is honestly worth 25s. per foot, or 165,000s. sterling for their entire property. On the above amount the British, when clear of reef, is capable of paying 36 per cent. per annum as long as diamonds maintain their present value. This company's ground was put into a company at about 100,000s., on which amount it has just given a dividend of 15 per cent. for the quarter, being the exact amount that I stated in the Journal four months ago that they would pay. I am pleased to notice they are not as yet such heavy losers by the late fall of reef as many of their neighbours. The Barnato Diamond Mining Company holds, according to the plan, 3600 square feet, which is about correct. None of this company's ground has cut out, and is not likely to do so for a depth of at least 1500 ft. The Barnato ground was put into a company at about 115,000s., an amount on which it is capable of paying 36 per cent. per annum whenever it is clear of reef. These two companies, though small, are splendid concerns.

The Kimberley North Block Company show on the plan about 3700 square feet, but I estimate their actual holding at only about 800 square feet, the value of which is very little up or down 16,000s., but their prospects are very precarious, and the best thing this company can do is to try and join on their bit of ground to some more powerful company at about the price I have named. The Great Central Diamond Mining Company shows on the plan about 67,500 square feet, the actual area of their rich diamond soil being about 63,000 square feet. The Central Company's ground, according to my valuation (valued according to the present price of diamonds), is worth 1,260,000s. sterling, an amount on which it is capable of paying 32 per cent. per annum as long as diamonds maintain their present value. The Central Company is, without doubt, the best diamond mining company in South Africa, and with fair play and proper management I do not hesitate to say they can pay large dividends for a longer period than any other company that has ever started on these fields. The French Company have a very fine property, and second only to the Central; their ground shows on the plan to be about 51,300 square feet, their actual holding being about 44,000 square feet, which I value at 900,000s. The prospects of this company are very good indeed, they will soon be clear of reef, and be able to devote their whole attention to the return of diamonds. Their new manager, Mr. Knight, is a vast improvement on all previous managers, and I notice that he has already inaugurated reforms which will, in my opinion, effect a saving to the company of from 70,000s. to 80,000s. per annum.

The piece of ground marked Stamford on the plan is of no value, and has ruined all who have had anything to do with it, the last being Messrs. Turton and Edwards. I have described nearly all of the really rich ground, so that if a line be drawn from claim 555 on the north to claim 490 on the south, the ground east of the line may

safely be called the rich part, while all to the west is of a more doubtful character. In fact, a great portion of the ground west of said line is of no value whatever. I will continue this subject in my next.

At Dutoitspan their troubles with treacherous reef has commenced. Their first fall has killed two white men and several black men. This ill-conducted property will soon work its own destruction; but if it was properly conducted it would be a profitable source of industry for many years. I notice that strenuous efforts are being made to puff Jagersfontein; but unless they alter the mode of management it is impossible for the mine to be a success. There are splendid diamonds there, but honesty and efficient management is essential to success. Times in Kimberley are very dull indeed, notwithstanding the good dividends declared by some of the companies. The small-pox still causes much alarm, but the Mining Board appears to be a little better. Messrs. Robinson and the noble Olsen have not yet fought the anticipated duel, and some say they are afraid of each other, but some of the knowing ones say it is only the calm which precedes the storm.

With regard to the new gold fields which I have always condemned, all the papers in this country who formerly puffed them up appear to vie with each other in denouncing them as the most palpable swindle which ever disgraced South Africa. Spitzkop appears to be as good as any of the old diggings, but intending speculators must understand that there is only one Spitzkop, although there are several false brands. There is a certain portion of the community of this place on which everything from rape to manslaughter sticks; hence they have acquired the sobriquet of the sticky set. Should I, therefore, refer to the sticky set in any future letter, your readers will know what I mean.—*Kimberley*, Oct. 9.

CORRESPONDENT.

NEW CALLAO.

SIR,—I notice you have slightly misprinted my communication to the Journal of Oct. 28. "S" in the first sentence, and "if issued" in the second one of the second paragraph should have been "£" and "is issued" respectively. As the immunity of promoters or vendor's language is questioned I have not altered my position in the least, and cannot be said to concede what was never argued. If the secretary had re-read this correspondence before replying all but his last sentence would have been left out I think. I suppose the petitioner to be the author of the phrase "immediate vicinity," which he quotes, and, though not adopting it, I think it is permissible, as you cannot overlook the fact that when speaking of El Callao and New Callao you speak of two mountains or ranges of mountains; anywise the vendor should be the last person to cavil therewith. The shareholders have yet to know that the present embarrassments and loss would have resulted had the vendor defined the distance between New Callao and El Callao, or simply recited in the prospectus some of the gold mines in Venezuela, without adding a misleading sentence and clause which have been taken to qualify the report therewith, and had other points in the prospectus correct and perspicuous. I dislike litigation as much as anyone, but it would be simply wrong to enrich another because of that dislike, and the company can wait the means to try the points. Of course, the directorate having compromised they cannot be expected to act under compulsion, and it would be glad news to know they were succeeded by a board to work out the original plan, which being for the general improvement should have the good wishes of all. Presently, however, before owning our helplessness, comparative good fortune, and so forth, it would be instructive to know what information and help the vendor has received from the New Callao for 5000s. in shares of a company with a nominal capital of 150,000s. (who are to pay 90,000s., half in cash and half in shares for the property) would have cost the vendor in hard cash without the aid of the New Callao.—*Kirkcaldy*, Nov. 6.

W. H. P.

THE GREAT COAL FIELDS OF THE UNITED STATES.

SIR,—In the *Mining Journal* of Sept. 30 I observed that Colonel Killebrew in his notes of a recent visit to the Great Warrior Coal Field, Alabama, says—"Prof. Smith, the State Geologist of Alabama, considers that there are not less than 2600 ft. of coal measures. Mr. W. A. Gould, after 25 years prospecting, knows the coal measures there to be over 4000 ft. in thickness. If this is the case the great Alabama coal field throws every other American coal field in the shade." It is further stated that the coal measures in Pennsylvania according to Prof. Rogers are 2089 ft. thick. I do not question Col. Killebrew's facts in regard to Alabama, but I wish to state some facts in regard to Pennsylvania which may modify his claim for Alabama. In Western Pennsylvania, according to Prof. Lesley, State Geologist, the coal measures comprise a series of rocks 2500 ft. Along the flank of the Alleghany Mountain in Northern Pennsylvania they are 3000 ft. thick, exclusive of the Pottsville conglomerate or millstone grit, which is 129 ft. in thickness. In the semi-bituminous basin of the Broad Top Mountain, in South Central Pennsylvania, the carboniferous strata are over 1500 ft. thick. In the anthracite coal fields the coal measures attain their greatest development. In the southern basin near Pottsville the coal measures are 3250 ft. thick, and contain in the aggregate 154 ft. of coal. The entire carboniferous strata, including the millstone grit at Pottsville, are over 4000 ft. in thickness. The coal fields of Alabama are very rich in valuable coal beds, and the association of coal, pure limestone, and high grade iron ores in close proximity are bound to make the State a large iron as well as coal producer. At present, however, Alabama can scarcely be said to throw Pennsylvania in the shade even in its thickness of coal measure.

CHAS. A. ASHBURNER,

Geologist in Charge Survey Anthracite Coal Fields.

Philadelphia, Oct. 23.

THE TIN TRADE.

SIR,—When last addressing you in the month of July I took occasion to direct attention to the false statistical position which had at that time been created by the apparently preconcerted detention of tin at the usual ports of shipment. This opinion is now supported by the following figures, which show that the altogether unprecedented quantity of 7175 tons was shipped for Europe and United States of America in the three months ending Oct. 31, or more than double the total of the preceding three months—

Straits and Australian shipped for—	London.	U. S. A.	Total.
August, September, October, 1882.....	3,925	3,250	7,175
May, June, July, 1882.....	1,490	1,985	3,475
Increase in the last three months.....	2,435	1,265	3,700
Shipped to Europe and U. S. A. from—	Straits.	Australia.	Total.
January to November, 1882	10,385	7,715	18,100
January to November, 1881	9,150	7,075	16,225
Ten months increase of production ...	1,235	640	1,875
Delivered ex—	London.	Holland.	Total.
January 1 to October 31, 1881	12,565	7,139	19,704
January 1 to October 31, 1882	12,605	5,813	18,418
Ten months decrease of European consumption	—	—	1,286
Dutch and English Stocks—	Tons.	Value.	
November 1, 1878.....	17,154	£60 0 0	
November 1, 1879.....	16,237	93 10 0	
November 1, 1880.....	14,975	89 0 0	
November 1, 1881.....	13,579	97 10 0	
November 1, 1882.....	14,025	98 10 0	

The sudden announcement of these floating quantities has been sufficient to cause a relapse of 8s. per ton in London values. It will be further apparent from the figures which I enclose that for the 10 months ending Oct. 31, 1882, there has been an increase of 1875 tons in shipments from the Straits and Australia, which quantity, added to the 1120 tons of increase in the 10 months' import to Holland, exhibits an increased production of 2995 tons, when at the same time a decrease of 1286 tons has occurred in European consumption. I would finally point out that the stock of to-day is equal or almost equal to that existing on Nov. 1, 1880, when the London price was

10s. per ton below present values. These serious facts expose a position which most people would consider as fatal to speculation, and I submit that in all the circumstances there is more than ever occasion for buyers to remember the well-worn watchword, *Caveat emptor*.—*Nov. 3.*

CYMBRO.

STAMPING MACHINERY.

SIR,—Since reading Mr. Husband's interesting paper on Stamping Machinery, read at the meeting of the Mining Institute, and the discussion that followed, I with many others, no doubt, have been looking out for further information in your valuable Journal especially relating to "whether they could introduce anything that would pulverise their stuff cheaper than the old Cornish stamps." I had some experience in California with the revolving (head) stamps, and the average crushing of quartz amounted to about 35 cwt. per head per 24 hours. In the Transvaal gold mines of South Africa (where I had the management) thousands of tons of quartz were crushed by one of Husband's Pneumatic Stamps, and herewith I give you the particulars of five successive crushings taken from my stamping mill memorandum book as follows:—

Heads Working.	Hours at Work.	Tons Crushed. 2000 lbs. to ton.	Aver. quantity crushed per hour per head. 2240 lbs. to ton. c. qrs. lbs.	Aver. quantity crushed per 24 hours per head. 2240 lbs. to ton. Tons. c. qrs. lbs.
2 ...	233 ...	155 ...	5 3 21 ...	7 2 2 0
2 ...	453 ...	263 ...	5 0 20 ...	6 4 1 4
2 ...	279 ...	154 ...	4 3 20 ...	5 18 1 4
2 ...	301 ...	180 ...	5 1 10 ...	6 8 0 16
2 ...	197 ...	132 ...	5 3 26 ...	7 3 2 8

Average, 6 tons 11 cwt. 1 qr. 12 lbs. per head in 24 hours.

The fuel for the engine was very small green wood (mimosas), and the engine-men had difficulty in getting sufficient steam to enable the heads to give 150 blows per minute. With from 135 to 140 blows per minute the Pneumatic would not crush more stuff than an ordinary stamps. This stamps (I think) was the second or third pneumatic made by Messrs. Harvey and Co. after Mr. Husband obtained his patent. I find that considerable improvements have been made on them since then. I admit that this stamps required much more attention than most others, in consequence of the effect that the hot climate had on the leather bushings. These are now dispensed with in the more modern machines, and do not now require more attention than all stamping mills should have to see that the maximum number of blows were given, and that the heads were always at the proper pitch, especially as the heads wore away. The engine-man should have a memorandum book ruled for date, speed, what time the stamps started working, the time when it stopped, with a space opposite for remarks, stating the cause of stoppage, &c. This is done in most foreign mines.

Since my return from South Africa I have many times named what we did with Husband's Pneumatic Stamps, and asked why cannot the pneumatic stamps be worked with similar or even better results in Cornwall. I have never had any conversation with Mr. Husband or either member of the firm of Messrs. Harvey and Co. with regard to this stamps. JAMES POLKINGHORNE.

Marazion, Nov. 7.

THE PROPOSED TREVITHICK MEMORIAL.

SIR,—I can scarcely express the pleasure which I, as a Cornishman, felt upon reading the exhaustive and appreciative article in the *Mining Journal* of Oct. 21 suggesting the erection of a Memorial Hall to the honour of our greatest engineer, Richard Trevithick; but I am sorry to have to admit that this pleasure has been altogether extinguished by the supreme disgust which I now feel at the half-hearted, indeed almost insulting manner, in which the matter has been taken up by the Mining Institute of Cornwall. I am quite willing to make every allowance for the unfortunate circumstance that the President of that very learned body but nominally belongs to that honourable profession which made Cornwall great by facilitating the development of its vast mineral wealth with the aid of steam power; yet that, at a meeting of 30 members of the Mining Institute of Cornwall, any applause could be given to the namby-pamby suggestion of a tomb at Dartford, instead of the proposed Memorial Hall in Cornwall, is a reflection upon Cornishmen and an insult to Trevithick's memory. Why, in these days of steam stone-sculpting machines and cheap railway transit, the handsome proposition of the President of the Mining Institute of Cornwall would not involve the expenditure of a ten pound note, so that, small as is the number of members of the pigmy institute, a subscription of half-a-crown a head would do the business.

Perhaps it is the knowledge of this that makes the President so proud; perhaps he wishes the Mining Institute to have all honour of memorialising Trevithick, and fears that if a Trevithick Memorial Hall were erected, the old wife's stamps still occasionally met with at mines would be ignored altogether. A tombstone to Trevithick forsooth. Why, even as a poor miner, whose wages have not reached 16s. a week for the last twelve months, I would help to the extent of one day's labour and half a day's pay to do something better than that for the memory of Trevithick. If there be no more Cornish blood to be found at the Mining Institute meetings than is shown by such treatment of a great Cornishman, let the Institute return to that nothingness which it so ably represents. It may really almost be doubted whether the President has himself heard of Trevithick until recently, though he has now read up a little evidently; for he started with the explanation that the newspapers had recently noticed that Trevithick was one of the greatest engineers Cornwall, and perhaps England, had ever seen, next year would have been dead 50 years, and it was proposed to raise a monument over his grave, on the occasion. Where and when did the extremely learned President find this proposition? It must have been in some place else than the *Mining Journal*, and at a date more recent than Oct. 21. In other words, he has lost the substance and remembers only the shadow; and the sooner he loses that likewise the better for himself and for the memorial also. He has "been in communication with some gentlemen on the subject," but why he did not explain; yet I would say that unless he be bent on thwarting the project he would not advocate an alternative proposition in order to jeopardise the original. Is this a case of "save me from my friends?"

But let us see what was the result of his communication with his gentlemen friends. He continues that it was thought advisable to ventilate the subject before next year in order that it might be ascertained what it was intended to do, and it had struck him that the gentlemen connected with the Mining Institute of Cornwall were the very persons to take this matter into consideration. Trevithick gave us some of the greatest powers we had to-day received—the Cornish boiler, the high-pressure engine, the locomotive engine, and he introduced a method of working on high-pressure steam, without which our pumping engines could never have done the work they had done. He (the President) supposed that Cornwall had produced two men with the most vivid imaginations England had produced anywhere else—Trevithick and Davy. There was hardly any difficult matter that came under Trevithick's notice, but he had a plan of overcoming the difficulty. He thought that a gentleman of the standing of Trevithick, who has done so much for Cornishmen, and for the progress of industry throughout England, was a man who should not be forgotten. They saw that the laurels Trevithick had won others had endeavoured to snatch from his brow, as for instance, Stephenson, who had been credited with the invention of the locomotive engine, but with which Stephenson had very little to do. In London at the present day Stephenson was regarded as the inventor of the locomotive; but they in Cornwall knew better, and he thought that if they allowed the opportunity of commemorating Trevithick's memory in a suitable manner to pass, they would be rather neglecting their duty. He hoped they would consider the matter and discuss it among their friends, and that next year they would take advantage of the opportunity by commemorating the memory of Trevithick in a way they ought to do.

There's enthusiasm for you. There's a specimen of that sanguine temperament that makes the Cornish miner succeed where others fail. The President "supposes Cornwall has produced two men with the most vivid imaginations England has produced anywhere else—Trevithick and Davy." This is a reflection on both Trevi-

thick and Davy. It is just because Trevithick's imagination was no part of "the most vivid imagination that England has produced anywhere else," that Cornishmen should honour his memory, and not by a half-a-crown a-head subscription from the members of the Mining Institute of Cornwall, but by liberal contributions to the extent of their means, no matter whether they be in England or elsewhere. The proposed Trevithick Memorial Hall would be of greater pecuniary benefit to the Mining Institute of Cornwall, Royal Cornwall Polytechnic Society, and Miners' Association of Cornwall and Devon than to anyone else, and therefore the members of those bodies should contribute handsomely, either in money or free labour; but let all Cornishmen and Cornish mine-owners pull together, and let not an old wife hang on to the kibble while others turn the winch; or instead of a Trevithick Memorial Hall, we shall have nothing to aid our memory but—

Truro, Nov. 8.

GOLD IN IRELAND.

SIR,—I discovered auriferous iron pyrites and quartz reefs in a mountain district in West Cork 35 years ago; the mine is also argentiferous. In the same district I have seen a lode opened at surface 20 ft. wide, which will probably on an average yield from 20 to 25 ozs. of silver per ton, and veins of copper ore of 35 per cent. and 300 ozs. of silver per ton.

Cosheen Mines, Schull, Co. Cork, Nov. 7.

WM. THOMAS

PRACTICAL MINING—SHAFT SINKING.

SIR,—The particulars of work accomplished by means of two Darlington Cradle Drills in sinking an engine-shaft at the Madonna Mine in Germany may be interesting to many readers of the *Mining Journal*. The shaft is in hard grauwacke, a silicious rock common to Rhenish Prussia. The time occupied in sinking the shaft from the 90 to the 114 metre level (24 metres, or 13 fms. 2 ft.) was seven weeks—from Aug. 28 to Oct. 14. In the actual boring of the holes for obtaining the sink 237 hours were occupied, and there were seven hours' hindrance in all. During the time mentioned 660 holes were bored, giving 1980 lineal feet in the aggregate, showing the average depth of the holes to be 3 ft., and 1918 bits were blunted. In charging and blasting the holes 180 hours were usefully occupied and 14 hours consumed by hindrances; 350 lbs. of dynamite was used, and fired by 668 electric fuses—20 fuses misfired. The removal of the stuff (1754 kibbles, weighing together 551 tons) occupied 420 hours, and 133 hours were consumed by hindrances. The totals, therefore, show that 24 metres of ground were sunk (there being 31 separate cuts or sinks) in 993 hours usefully employed and 166 hours consumed by hindrances.

The hand cost per metre for sinking the ground was estimated at 12l. 10s. The machine cost, including wages of miners, cost of explosives, materials, compressing air, superintendence, and allowance for wear and tear of apparatus was 9l. 8s., showing a gain per metre of ground sunk of 3l. 2s., or almost exactly 25 per cent. The time required to sink the 24 metres by hand labour would have been 32 weeks; the sinking was effected by the two Darlington drills in seven weeks, showing 25 weeks. The pressure of air used in running the drills varied from 45 lbs. to 50 lbs. per square inch, and the percentage of time required for each operation was—boring holes 23.8, charging and blasting holes 18.3, removing stuff 42.3, hindrances 15.7. The hindrances fell on the different sections of the work in the proportion of—boring holes 0.04 per cent., charging and blasting holes 0.08 per cent., and removing stuff, including time required for dividing and casing the shaft, 99.88 per cent.

The hindrances consequent on the removal of the stuff were chiefly due to dividing and casing the shaft (included in the time of sinking, seven weeks) dropping and placing pumps in position and changing buckets and clacks. The hauling gear was also of limited power and speed, consequently the time incurred in the removal of the stuff was more than 42 per cent. of the entire period. With such improvements as might readily be introduced in the drawing appliances the time of sinking might have been much shortened and the speed proportionally increased. With the Darlington drills, suitable shaft sinking appliances, and well trained miners there is no reason why an engine-shaft in very hard and compact ground might not be sunk at the rate of at least 10 fathoms a month.

Nov. 3.

RHYDDU SLATE DISTRICT, CARNARVONSHIRE.

SIR,—Your North Wales Correspondent has done investors a service by calling attention to the promising slate quarries of the Rhyddu district, which undoubtedly have, as he says, "a great future before them" as soon as depth is reached. It is a question whether it is not better to work these quarries by underground chambers rather than as open quarries; as, although the top rock shows excellent cleavage, it is in most cases not solid enough to open in for slate making. The working of these quarries is watched with great interest; and, as they enjoy direct railway communication with Carnarvon, there is little doubt that they will yield large profits before long.

C. P. D.

SOUTH DEVON UNITED COPPER MINES.

SIR,—A point is reached in this property of the greatest possible interest. The Pickstone shaft was sunk from surface to the depth of 140 fathoms in 1876 to work the lode in the new channel of ground which had been seen at the 124 fathom level in the old sump; but the deficiency of pumping power would not admit of following it, in that shaft, to a lower point.

After Pickstone's shaft was sunk to the 140, and a cross-cut of over 2 fathoms in length driven to the lode, and the lode cut through, nothing more was done until recently, when it was recommended to continue Pickstone's shaft to the 153 fathom level. This has been done, and a cross-cut is in progress to the lode. It is expected that the cross-cut to the lode, and cutting through it, will be completed this month. Should the valuable course of ore be then laid open, which has been estimated to resemble some of the finest which the West Cornwall mines have produced, the shareholders who resolved to hold until this piece of work is completed, will act wisely. The lode at the 140 just entering this new channel of ground is one of the finest ever seen under similar circumstances.

Nov. 9.

NORTH METAL MINE.

SIR,—Calling at North Metal Mine to-day, I find that the stamping appliances will be ready for operation on Saturday next, although the preparations have been delayed by the late heavy rains. The dressing-floors will be prepared immediately. Tinstone is waiting for reduction, and enough will be ready to keep the stamps at work day and night. Twelve additional heads will be wanted quickly. The engine-shaft is about 30 fms. deep under adit, which is 17 fms. from surface, and is on the lode from about the adit. The lode is good in the bottom, and also in the eastern end of the 30. The miners are raising good tinstone from the 10 and from the stopes. Tributaries are at work. The mine is cleared of debris, and all the points are looking well. The sinking of the engine-shaft will be resumed on Monday next, and a cross-cut thence to intersect Wheal Vor main lode will be set on Saturday next. This lode, upon which I set great hopes, is estimated to be about 20 fms. south of the engine lode, and has been untouched by modern miners, east of Wheal Vraeh—the eastern portion of Wheal Vor. The engine-shaft is cased and divided from surface to the bottom, and the footway is good. Machinery is working admirably. A building has been erected containing a dry material house, office, and changing-room, principally of wood. Everything has been done economically and well. Capt. Ridington, who is very energetic in his duties, tells me that in a short time black tin will be ready for the smelters, and that regular sales may be looked for.

NEW GREAT WHEAL VOR.—The masons are engaged in building the engine-house, and men are also engaged in opening the engine at Polhigey Moor, in Wendron, for its removal to the mine. The engine was purchased of Messrs. Harvey and Co. a few weeks ago at a fair price. The lode in the level (I believe 17 fms. from surface) is producing good tinstone. I suppose that a large heap will be on hand by the time the reduction works are ready. A small, but com-

fortable house, has been erected for the agent, that he may be always on the spot in the day time. The proprietors of these mines, and of Great East Vor, may well be congratulated on their good fortune in acquiring mineral properties which present such evidences of real value as these mines present.—Truro, Nov. 9.

R. SYMONS.

SHROPSHIRE LEAD MINES DISTRICT.

SIR,—The East Roman Gravel Company have a fine property; the sett is in the heart of the ore-bearing strata of the district, and it is a network of lead producing lodes, and we hope they will go in for developing the old Wood lode. A comparative short cross-cut from their boundary shaft would intersect three or four powerful lodes at the right point for finding them rich. We think the one lode they have been working has turned out pretty well; but our faith for a great and rich mine in the future is in the Wood and Cornish lodes. These two lodes are coming together in their underlay, and by deepening the Wood shaft some 10 to 15 fms. we would reach the said junction, and as the two lodes have been falling off in value, before they come together a change may reasonably be looked for, and so we expect they would find it rich at and below the junction. At any rate, it will not cost much to prove this very promising and important point, and we hope to see them prove it soon.

MINER.

WEST OF CORNWALL—ST. AGNES.

SIR,—In reply to the Wheal Coates shareholder whose letter was in the *Journal* of Saturday last, I may remark that I have nothing to withhold from any of the shareholders of the group of mines I referred to, and certainly nothing came under my notice to the prejudice of Wheal Coates. That mine, with its new management, seemed to hold a high position with those with whom I conversed. The impression left upon my mind by the practical remarks of the most experienced miners was, that Wheal Coates was not only a sound investment, but was in a forward state of development, and that any day the shares might advance to a much higher figure.

Nov. 8.

TOURIST.

GENERAL MEETINGS.

SIR,—I observe in a recent *Journal* a complaint from a correspondent as to some company that he is interested in not having complied with the Limited Liability Companies Act in holding their annual meeting, and am afraid that the company he refers to is not the only one. I know of several (Cornish mines in particular) that have not furnished their shareholders with a single statement of accounts since they were floated, or yet have held an annual meeting as prescribed by the Act. I must, however, compliment them upon their regularity in making the calls. I purpose waiting a few weeks to see if any notices of general meetings are announced. If not, in the interest of my co-shareholders and myself, I shall consider it my duty to call the attention of the Registrar of Joint Stock Companies to the fact.

Nov. 4.

A SHAREHOLDER.

THE MULBERRY TINWORKS.

SIR,—Can any of your correspondents afford me some information respecting the affairs of the above company. In the early part of this year this "famous tin mine" was converted into a limited company, and amongst the inducements held out by the prospectus were the absolutely non-speculative character of the undertaking, its freedom from the uncertainties of mining operations—being then a going and paying concern—a 20 to 30 per cent. dividend, and, lastly, in extra thick type, the announcement that, in view of the continuous profits being made, it was proposed to pay quarterly dividends, the first of which would "be paid in September." September duly arrived and passed without any dividend arriving with it, and I then wrote to the secretary asking when the dividend was likely to be paid? I received a most courteous reply to the effect that, owing to the secretary's severe illness, the audit of the accounts had been delayed, but was then proceeding, and it was expected that a substantial dividend would be declared "in a few days."

October, however, also passed off duly, and still brought no dividend; I then again wrote asking if there was any prospect of a dividend being declared, and to that enquiry I am still without any answer. I have no intention of reflecting on the *bona fides* of the directors; but why, I ask, make promises which manifestly are not performed? It is, I submit by such tactics as these that confidence is destroyed and mistrust sown broadcast; investors, too, are thereby deterred from employing capital that might be profitably utilised for all parties concerned, instead of being allowed to remain practically idle.—South Norwood, Nov. 8.

F. G. H.

WALKHAM UNITED MINES.

SIR,—The enquiry of "A Shareholder" is entitled to receive a satisfactory reply from the directors. Although I am not a shareholder I know the properties now united under this company's control. They are good and promising sets, from both of which considerable parcels of tin have been sold before the present company took them over. They are worked by ample water-power, the machinery I believe is in good condition, and capable of raising and dressing large parcels of tin for the market. Three capital tin lodes are known to run through the sets, and can, I understand, be easily intersected by driving only a few fathoms further in an adit which was put in some years ago to lay open a fine blende course which is understood to cross the tin lodes at a point very near the inner end of the adit. Besides these there are good copper lodes in the sets, to work which they were first taken up by two different parties some years ago. Few mining properties possess more largely the elements of success than the Walkham United Mines do.

Why then are they not working successfully? The answer is easily found. The present company was launched with too small a working capital, and as a consequence it has never risen to the level of a success which with adequate means judiciously used it could have done, and may still do if the shareholders are wise enough to find a comparatively moderate capital for the purpose. That is all this company requires, and your correspondent and his co-shareholders have the case in their own hands.

Torquay, Nov. 6.

H. M.

GUNNISLAKE (CLITTERS) MINE.

SIR,—In the report of this mine, issued to the shareholders on Oct. 31, there are statements made which deserve more than cursory notice, but which may possibly have received little or no attention from the majority of the shareholders, and perhaps are unknown to a large number of your readers who are not directly or indirectly interested in the property. The facts set forth by the agents fully warrant me in saying that there is no adventure in the east of Cornwall which can equal it for actual value, nor surpass it for prospective remuneration to the shareholders. The progressive value of the mine can be clearly seen by a comparison of the official reports published on July 3, 1882, and Oct. 31. At the former date there were 14 levels being driven, having an aggregate value of 56l. At the latter date the same number of levels were worth 126l., or an increase of 70l. On July 3 there were 16 stopes, worth in the aggregate 118l. On Oct. 31 17 stopes were worth 170l., showing an increase of 52l. In the interval between the two before-mentioned dates a profit of 1600l. was made; the position of the company is, therefore, unmistakable, and no further commendation of mine is needed to show the intrinsic value of the mine. Such a condition is highly encouraging to all parties concerned, and as I take it equally encouraging to the shareholders in Old Gunnislake, and for reasons which I will now briefly mention.

The Bonny lode, which doubtless will shortly be cut at the latter mine, is the lode which has produced all the ore raised in Clitters for the last 25 years; it is the same lode which is showing increased productivity in proportion to its greater development. Seven of the 14 levels being driven are in the direction of Old Gunnislake, and are within 300 fathoms of the ascertained point of intersection, and it is now only a question of a few weeks to prove the value of the lode in this sett. There is a fair presumptive evidence that it will be found valuable when intersected, and the shareholders who have vacillated betwixt hope and despair for many months past may

reasonably take heart at the completion of efforts and operations, which, to use the most prudent expression, is almost sure to bring them a reward for their outlay and patience in the prosecution of their property.—Tavistock, Nov. 7.

O. G.

PENTIRE GLAZE SILVER AND LEAD MINE.

SIR,—I was much delighted to see a letter in the Supplement to last week's *Journal* about this mine and others as well, signed T. M. Pascoe. I have known all these mines that have been worked in this north part of Cornwall over 30 years, and most of them I have been underground and seen for myself; in fact, some of them have turned out when worked, but now abandoned, to have been the richest mines for silver in England. You say, why are they not working now? Because of want of capital. Pentire Glaze Mine must have returned hundreds of thousands of pounds worth of mineral the time that it worked last, and to see the deep gunnies which I have it would show what silver-lead had been taken away. At that time only two adventurers worked there; one was a parson, the Rev. Mr. Harding, and the other was Mr. Parcheston, of the Bank of England, after some years he had to sell his part, and sold it to Mr. Dunkin, a railway contractor, and ultimately Mr. Harding and he could not agree together, and the mine was closed. That is the old mine; but where they are working now is further south. I have seen some of the lead; it is rich for silver. I have not seen where they are working, but I am going to see it in a few days.

Now, we will come to the richest mine of all for silver, that is Old Treburgett, which would have been working to this day there is not a doubt on my mind but for want of capital; when they started that grand old mine they had only 1000l., and I believe the ore that was sold amounted to 60,000l., and the highest price per ton made 37l. 7s. 6d. of one parcel. Seeing a mine so rich for silver and the engines on the mine, it is a mystery to me that someone cannot make a stand. I will write some future day about other mines more fully, for I believe, Mr. Editor, that this north part of Cornwall will become one of the richest silver-lead districts in England, looking forward to bright spring should lead take a rise, which I have not a doubt about it.—Wadebridge, Nov. 8.

W. PAYNTER, jun

THE AUSTRALIAN GOLD FIELDS—VICTORIA.

SIR,—Mr. Brough Smyth since his return from India has made an extended tour of the western gold fields of Victoria, visiting among other well-known places the Creswick section of the Ballarat division. Referring to the deposits now being worked in the remarkable formation which prevails there—the surface of a widely distributed area presenting the characteristics of a strong lava burst or overflow—where, after penetrating 200 feet of volcanic rock, the reef wash has proved productive at a depth of 400 and 500 ft., Mr. Smyth makes the following interesting notes:—

It is not easy to convey to those unacquainted with the modes in which auriferous drifts occur any accurate knowledge of the peculiarities of these formations. The untrained observer should visit the localities where they appear at the surface, and assisted by an expert study both maps and sections. At the sources of the Creswick leads, as elsewhere in the colony gravels and clays are found which in ages long since past were derived from the disintegration of the quartziferous silurian rocks. Much of the mud was washed away by rains and streams, and debris and detritus rich in gold were left in the beds of the ancient creeks. Other changes took place either through the obstruction of water-courses by fallen masses of rock, or by the wearing away of the narrow necks of horseshoe bends, the cutting-back power of the waters came into operation, and the gravels and drifts of the original beds were left high and dry. These in the lapse of time lost altogether their character. Wasted by water and by weather the continuity of the line was broken, and they appeared as low, rounded hills, bordering the still active waters of the creek below. This creek again, puddling and washing auriferous material, deposited its burden either on the upturned edges of the Silurian rock, or on the denuded surface of the older deposits, and the rain-fed rivulets, constantly gnawing at the oldest and the youngest rocks, made for themselves new outlets, new courses, and fresh deposits. Formed in this manner there are no less than three well-marked, distinct drifts overlying the silurian strata, all of them older than the sheets of volcanic lava which flowed from the adjacent craters. The alterations of the surface features caused by the rolling molten lava cannot always be traced; but it is beyond doubt that streams were diverted, lakes formed, and vast masses of gravel, silt, and mud deposited, only to be worn away and redeposited when the volcanoes ceased to be active. The volcanoes during a brief geological period poured forth lava, mud, and ashes, tore up and tossed into the air great blocks of the lower sedimentary strata, but all the time the streams were doing their work, eroding the rocks thrust in their way, and finding by the easiest but not always the most direct courses other lower channels into which they poured their waters. Meteoric forces have curiously sculptured the surface of the volcanic plains, and the creeks have held their way through periods of time so long that no estimate can be formed of their duration; but acting on hard rocks relating disintegration and decomposition, they are now far less effective in the removal and redistribution of material than they were when they flowed through the rather soft mudstones and shales of the palaeozoic age, and the more easily moved gravels of the tertiaries. The miner has to deal with surfaces underneath the lavas, whose general features are accurately represented now on the boundaries of the volcanic rock. He finds drifts newer and older; he finds channels with tributaries, and the so-called reef washes. By the very necessities of his work the mining manager is compelled to be a geologist. He sketches the gravels and clays with an eager eye. A slight influx of water, a change in the colour of the washdirt, a slight difference in the character of the gold, a sudden dip of the gutter, each has his close attention, and from indications when any but an experienced man would slight, he determines in what direction his drives shall follow.

The condition of the Creswick and Kingston group of mines may be regarded as healthy. Seven mines now producing gold are represented by 100,000 shares, on which 93,570l. have been paid up. At the present rate of yield of gold the gross product per annum is of the value of 586,000l.; the dividends amount to a quarter of a million sterling per annum, and the market value of all the shares according to the latest quotations, is over 900,000l. Now, considering that many of these claims or holdings have only lately touched the gutters where the richest washdirt may be looked for, and that the extent of their workings relatively to the immense field before them is small, it is not unreasonable to suppose that the profitable work will be continued for many years; that new leases, with many tributaries will be opened, and that subsequently, when the rich tertiary and post-tertiary gravels are exhausted, the auriferous quartz veins which have fed the leads will be explored, a new and different system of mining established, and all the prospects of enduring prosperity presented as at Ballarat. That the recent deposits now filling the gutters, and forming what are not inaptly named reef washes, are derived from the disintegration of quartziferous rocks in the immediate vicinity of the ancient water-courses is proved conclusively by the character of the debris and the form in which the gold appears. The latter is not always much water-worn, it has not travelled far, and the large rounded blocks and boulders of quartz show that no insignificant veins have supplied the material which is daily drawn up from the mines and passed through the puddling-machines. This does not exclude the probability of there being thin and very rich leaders from the reefs, but it is more than probable that the small and large nuggets, and the very coarse gold have been derived from thick and persistent veins of quartz, which heretofore have proved permanent gold.

Passing through Maryborough en route to Bendigo, Mr. Smyth, referring to the rich discoveries at the first-named place when it was rushed in 1854-5, states that at the time of his recent visit (August, 1882) the quartz at the well-known Mariner's reef was yielding at a depth of 600 ft. at the rate of 8 ozs. 7 dwts. to 1 ton, and the vein was of considerable thickness. Of Bendigo he writes as follows:—Sandhurst derived its wealth originally from the gold contained in the older and newer drifts; now it has to depend on its quartz reefs, and it may safely depend on them. Nearly 250,000 tons of quartz are crushed every year, with an average yield of over 12 dwts. per ton. In 1860, when alluvial mining was profitable, there were 1600 horse puddling machines at work, inundating the valley with sludge, which wastefully carried with it gold at the rate of 2 dwts. per ton; but now the valleys and low hills, whence the rich washdirt was derived, are exhausted, and not more than 100 of the old machines are at work at present; 22 years ago there were 128 steam-engines, of an aggregate of 2060-horse power, used in crushing quartz; and now the miners have 255 engines of 5082-horse power, driving over 1600 stamp-heads. Gold-bearing quartz is found at a depth of 1700 ft., or, say, 1000 ft. below the level of the sea. Yields exceeding 1½ oz. of gold per ton on large quantities of quartz crushed are not rare, and averages below 3 dwts., 4 dwts., and 5 dwts. per ton more than clear expenses. The estimated value of the lands held for mining purposes is nearly 3,000,000l. sterling, and yet the total area partially occupied does not exceed 10,000 acres. The number of men employed on the leased lands alone is 3500, and the number of miners altogether in the Sandhurst division is less than 6000. Nearly 500,000l. has been invested in machinery, and it is not surprising that the annual product in the shape of gold should reach the enormous sum of 800,000l. or 900,000l. per annum.

The reader can judge for himself of the productivity of this district. The yields of gold at Sandhurst for the first seven months of the past three years, as compiled by the receiver and paymaster, from returns furnished by the banks, are as follows:—

	1880.	1881.	1882.
January	12,956 14 13	13,113 8 0	10,577 2 16
February	12,831 10 13	16,392 8 0	12,278 9 12
March	13,456 13 11½	16,026 8 14	12,918 18 20
April	11,349 0 0	13,123 13 0	14,279 11 4
May	15,272 15 14	14,332 8 14	18,332 14 4
June	14,402 10 18	15,087 15 5	18,565 11 5
July	14,438 13 2	17,097 17 4	18,777 1 13

"Separate accounts of the gold got from quartz and the alluvia are not kept, but it is estimated that 1000 ozs. monthly of the above is alluvial and the rest reef gold. The large and regular increase in the yields is encouraging. At the Bendigo, from morning until night, speculators congregate and buy and sell with an apparent recklessness which only the initiated can understand. Under the Verandah at Sandhurst great transactions in shares take place, as at the Corner in Ballarat. The eager faces and the quick glances of those in the

crets of mining remind one of the trained and terrible people who frequent the Stock Exchange in London. In the midst of their hurried traffic, they have no thought but for gain; in their thirst for profit they forget the poor and the friendless; in their fierce desire to gain an advantage they cease to remember that some men may be weak and many may be foolish; but when the day's heavy work is over, they are once more altogether Christian men, and if an opportunity is made to them on behalf of any charity or good work, their purses are freely opened. It would be difficult, indeed, to circumvent a Sandhurst speculator if such a thing were attempted—he is acute and astute in business; but he is at the same time generous and almost profligate if he is solicited to aid in any beneficial work. In other words, the speculator is a good man of business, and if more in the world were like him the world would be governed well. He aids the development of mines, not rashly, but wisely—he studies his own interest, and in doing so conserves that of others—and not a few of the important discoveries of new fields are due to the daring and foresight of those who are supposed to be merely "dealers in shares."

Nov. 6.

P. A. EAGLE.

REPORT FROM CORNWALL.

Nov. 9.—There is no doubt now that November, 1882, will be a black month in the history of Cornish mining. We did not anticipate that it would show any recovery upon October, but we may frankly say that we were not at all prepared for the repeated drops in the Tin Standards, under the influence of which we are now suffering. Indeed, it would be very difficult to say who was, and the only consolation tin producers can have in the present gloomy aspect of their affairs is the certainty that if prices are against them figures are decidedly on this side. There may be some little dulness of trade—that which is natural at the close of the year setting in a little earlier than usual—but there is nothing in the general tin statistics outside the sphere of market operations to justify the position into which the markets have fallen. That is a view which we believe will be accepted by nearly all recognised authorities, and to my mind it is the only sound view to take.

While, therefore, the present outlook is in poor ore for the producers of tin, it is by no means so unhelpful for investors, and it is no matter of surprise to us, unless the waiting game is considered the best one to play, why there is not more business transacted in shares. It is quite possible that holders whose circumstance compel to realise may have to submit, in certain cases at any rate, to further substantial reductions, but for all that it is certain that already many shares are considerably below what we may call their permanent average, and a speedy re-action would disappoint a good many prospects. There is a good deal to be gained already by the wise speculator. By-and-bye there may be more, but assuredly there must be less.

Very general regret will be felt in mining and general business circles in this county at the death of Mr. W. R. Roebuck, who for many years had been labouring for the development of the natural resources of the county, and especially of Mid-Cornwall and the Perran district. He was a most sanguine and indefatigable projector, and had somehow the art of enlisting friends in all quarters, though he could not avoid the difficulties and disputes which are always attendant upon complicated business operations. He was the real author and founder, following out the designs of the late Mr. J. T. Treffry, of the Cornwall Minerals Railway, and his efforts for the development of the Cornish iron mines, and equally of the great Perran lode, were indefatigable. Difficulty after difficulty had to be met and overcome, but he never lost faith, and at the time of his death the prospects were brighter than they had ever been before, so that it is quite on the cards that he had pioneered them to success, though that success was not to be realised by him. The Duchy Mines, which he was the chief instrument of keeping afloat, are, at any rate, paying cost and something more, and other operations on the same great lode are, it is understood, about to be commenced. Sooner or later there seems little reason to doubt that Mr. Roebuck's expectations of the future of this district will in a large measure be realised.

TRADE OF THE TYNE AND WEAR.

Nov. 8.—The Coal Trade on these rivers has been retarded to a considerable extent during the past week, owing to extremely boisterous weather in the North Sea; but, on the whole, there is no falling off in demand for coals, coke, and fuel of all sorts. The steam coal works in Northumberland are still worked about five days per week, and most of the collieries in Durham are fully employed. The gas coal works are pushed to the utmost, and there are no stocks in hand of any consequence. The struggle which has occurred in Northumberland and Durham during the past few years to keep the collieries going with very little, and in many cases no profit has had the effect of putting a check to new enterprises and extensions; there has been very little movement in this direction of late; there are, however, some slight movements in this direction to note. At the most important new winning in Durham of late years, that at Marsden, which has been often noticed in this letter, good progress has been made of late, and a considerable quantity of good house and steam coal is now worked, and shipped as well as supplied to inland depôts. The fine beds of limestone found here have also been turned to good account, and a large quantity of this stone is sold to the chemical works on these rivers. Some of this stone is also used for building purposes, for which purpose it is admirably adapted. The Tyne Coal Company have now greatly developed the Hutton seam at Hebburn, and a large quantity of coal is worked there. This company are at present engaged in building a large number of houses for the accommodation of their workmen.

The old and celebrated colliery, Tyne Main, near Gateshead, has been closed a few years so far as coal working is concerned; but the water has been kept out of the Hutton seam there, and coal working is likely to be resumed again shortly. A large quantity of coal yet remains there in various seams which have been proved, and the lower seams below the Hutton seam are entire. The shafts have not yet been sunk below the Hutton seam. At Walbottle, a few miles west of Newcastle, a new shaft has been sunk lately, and coal working will be largely extended there shortly. In former times an excellent house coal was produced here, which held a good place in the London market. At Shire Moor Colliery, a few miles north of Newcastle, considerable progress has lately been made with the sinking operations, and a few days ago the High Main seam was found, by means of a bore-hole, at a depth of 48 fms. from the surface. This seam is upwards of 7 ft. in thickness here, and of this there is 6 ft. of good clean coal. A shaft will be sunk to this seam, and, in addition, a steep drift will be driven from the surface into the seam, and the coals will be hauled up this drift.

It is expected that when the next return is made by the accountants as to the selling price of coal in Durham that the result will show a sufficient advance to entitle the miners to an advance in wages. Nothing has as yet been determined as to the proposed alteration in the sliding scales in this district, but the question continues to be agitated and discussed.

The pig-iron trade has been quiet this week. The demand has not been large, and the transactions have been mostly limited to present wants. Makers now quote 41s. 6d. for No. 3 pig-iron. The demand for foreign consumers continues good. Germany last month took over 25,000 tons of Cleveland iron; Holland, about 10,000 tons; and France, 9,000 tons; Scotland, about 27,000 tons; and Wales, 9,000 tons. The total shipments did not quite reach 100,000 tons, as expected. The manufactured iron trade continues steady. Prices are not much changed. Bars are 61s. 2s. 6d.; ship-plates, 61s. 15s.; boiler-plates and sheets, 71s. 15s.; puddled bars, 41s. 2s. 6d. nett. The return of makers' stock for October gave a reduction of 30,211 tons. The stock within the last 13 months has been reduced 195,000 tons; that is, since the principle of restriction was put in force. Such large reductions and large shipments have not occurred before during the history of the trade. The stock of Messrs. Connal's warrant is now 102,348 tons—a reduction of 1070 tons on the week. The coal trade is firm. There is a strong demand for manufacturing coals. Coke is steady at 10s. 3d. to 11s. 3d. for furnace sorts at the ovens.

At Middleborough, on Tuesday, there was a fair attendance at the iron market, and a slight recovery from the decline of rates at the end of last week, when the "bears" were rather active. Messrs. Connal's stock to-day is 102,247 tons—a reduction of 601 tons on the week. The export trade in pig-iron has been unfavourably affected by the boisterous weather at sea. There was 16,300 tons of pig-

metal shipped for the week ending on Saturday—a quantity considerably under the average of last month. There is no doubt that if the weather had not prevented shipments last month there would have been the largest delivery ever known in one month. In the manufactured trade the steel rail trade is not prosperous, and at present there is no prospect of the renewal of trade with America. It appears that lately American producers have reduced the prices 20 per cent.

REPORT FROM NORTH AND SOUTH STAFFORDSHIRE.

Nov. 9.—The quietness which has existed in the pig market for the past two or three weeks has induced vendors of foreign sorts to this week accept lower prices. They offer deliveries at a reduction of 1s. 3d. to 2s. 6d. per ton upon the quotations of Quarter-day. Lincolnshire and Derbyshire sorts, for instance, are this week easy at 52s. 6d. Thornecliffe (South Yorkshire) pigs are quoted 62s. 6d. Native all-mines are 67s. 6d. to 70s., and common sorts 42s. easy. Manufactured ironmasters are here and there making concessions to old customers of 2s. 6d. to 5s. per ton, upon the nominal 10s. advance of the quarterly meetings, but other firms who have plenty to do are strong. Hoops are 71 to 71.5s., and plates 91 to 91.10s. Coal is without noticeable change on the week.

The South Staffordshire Mines Drainage Commissioners met in Wolverhampton, on Wednesday, under the chairmanship of Mr. Walter Williams, and accepted the scheme of Mr. Walter Bassano, one of their number, for a radical change in the future working of the Commission. This change was set forth in the following resolution, which was passed upon the motion of Mr. Bassano:—"That a committee consisting of three commissioners be appointed for the ensuing twelve months to undertake the duties hitherto performed by the Tipton District Committee, the Surface Drainage Committee, and the General Purposes and Finance Committee." Upon the motion of Mr. E. Fisher-Smith, the agent of the Earl of Dudley, the Chairman, Mr. Bassano, and Mr. Edmund Howl were appointed the committee indicated in the foregoing resolution; and upon the motion of the Chairman these gentlemen, or any two of them, were appointed to sign on behalf of the Commissioners any contract which might be approved by the general body. The Chairman explained that the affairs of the Commissioners having a month or two ago reached a stage more or less critical it had been thought that the business of the Commission might in future be more efficiently carried out by the new triumvirate than by the previous three several committees. The triumvirate was only appointed for a twelvemonth, and all their recommendations regarding works, &c., would have to be approved by the general body of the Commissioners. Their first duty would be to turn their best attention to the improvement of the surface works at a considerable outlay, in order to save the water from running into the mines. Now that the triumvirate had been formed he hoped to be able to quickly negotiate the loan which some months ago was authorised, but we understand had not yet been obtained.

The colliers of Hill Top held a public meeting on Tuesday, and after hearing addresses from their leaders on the questions of over-production and organisation, they passed the following resolution:—"That this meeting views with the most serious apprehension the continual increase of coal raised in the United Kingdom, and which has a tendency to lower miners' wages. Believing such can be stayed by a proper organisation of labour, we, therefore, urge all men employed in and about the mines of Worcestershire and Staffordshire to exert their power to induce others to unite, as a good and powerful union of workmen is the best means to secure the interest of labour." On Tuesday also a representative council of miners from the West Bromwich, Oldbury, Tipton, Coseley, Bradley, Dudley, Pensnett, and Gornal districts was held at Greatbridge to consider the action to be taken at the forthcoming conference, and to discuss the probability of obtaining an improvement in the sliding-scale by getting a minimum affixed to it. The conference was private, and the decision has not leaked out.

REPORT FROM NORTH WALES, SALOP, AND CARDIGAN.

Nov. 10.—Turning this week to Flintshire, to which county we have not paid a visit for a long time, we find the North Hendre Mine holding on its way, and rejoicing in a dividend of 8 per cent., which was declared at its meeting held in Chester last week. This mine is now the largest producer of ore in the counties of Flint and Denbigh, and it is a good example of a mine which, worked and abandoned by others, has come at last to the front, and for a series of years has yielded large returns. It is said that the reserves are extensive, and increasing as the workings extend.

The Halkin deep level is now approaching the workings of another historic mine, the Rhosmor, the nearest point of the level being only about 300 yards away. During the next year a communication will be made, and a considerable depth of lodes in the bearing measures will be unwatered, as well as a large extent of virgin ground along the lodes in the same measures will be made available. We may therefore reasonably hope that the present production of the mine, which is considerable, will before long be largely increased.

The Bala and Festiniog line was opened with considerable éclat on the 1st inst. It was stated in the course of the speeches that the Midland counties form the great home market for the Festiniog slates, and that this new line would greatly facilitate the traffic. It was also hinted that the point desired to reach ultimately was Port-din-I-leyn, a fine natural harbour on the Welsh coast, and a convenient point of departure for Ireland.

This was the goal the promoters of the Cambrian system of railways originally sought to reach, and as they are only seven miles off at Pwllheli they had better strain every nerve to complete their project, and so secure to themselves the advantages which others may otherwise reap. The anticipated strike in North Wales will not take place. The men continue to work at advances varying at the different collieries from 7½ to 10 per cent. The granting of this advance by the masters shows the trade to be in a healthier condition than it has been for some years past. The iron trade also is brisk, and the extensive furnaces and works at Southsea, near Wrexham, are to be restarted. The total production of lead ore in North and South Wales last year was 18,250 tons, being a decrease on the year 1880 of 2344 tons. The chief falling off was in Cardiganshire of nearly 2000 tons. There was also a slight decline in the production of other countries, Flintshire, Carmarthenshire, and Pembroke showing an increase. The total amount of silver yielded by this ore was 104,336 ozs., or nearly 5½ ozs. per ton of ore. Herebefore Cardigan ore has yielded the largest average of silver; but last year Montgomeryshire was first with 7 ozs. to the ton of ore, Flintshire following next with rather over 6½, and Cardigan coming in third with 6½. Still, as regards individual mines, Court Grange, in Cardigan, is the best silver-producing mine in the Principality, with nearly 35 ozs. of silver to the ton of lead ore. The total average is about the same as it has been for some years. Shropshire figures with 4½ oz., but this is due to the fact that the two great mines—Snailbeach and Roman Gravel—do not give any returns of silver. Tankerville by itself shows about 3 oz. In the production of lead Roman Gravel is now ahead by just 1000 tons of Snailbeach.

Of copper Wales produced last year 8175 tons, being an increase of nearly 2000 tons on the previous year. This is satisfactory. The increase in Anglesea alone was over this amount; but there was a falling off in Cardigan, owing probably to the unsettled state of things at the Cambrian mines. In zinc, reckoning for both years the bluestone of Anglesea among the ores, there was an increase last year of over 5000 tons, which is very satisfactory. In iron pyrites there was a vast increase, the production of Cae Coch Mine, near Treffhwi, Carnarvonshire, having advanced from 387 to 3107 tons. The returns of gold are nil, and perhaps our friends in the Dolgelly district will say how this is to be accounted for. The nickel and cobalt ore of Foel Hirddog, in Flintshire, increased from 49 to 63 tons, and the manganese mine near Abergele produced 304 tons, against 10 tons the year before. As far as metalliferous minerals are concerned, it is satisfactory to know that North Wales

holds its own. We may notice its coals and clays with other mineral productions on a future occasion.

TRADE IN SOUTH WALES.

Nov. 9.—The Sliding-scale Committee met on Tuesday last at the Royal Hotel, Cardiff, under the presidency of Mr. T. W. Lewis, to receive the report of the accountants for the four months ending Aug. 31 last, by which it is proved that the prices ruling during that period will not warrant a rise in colliers' wages in all pits working under the Association rules. There has been some movement among colliers here in favour of a rise, but now it is hoped all agitation will cease. The steam and house coal trades are extremely busy, and orders are plentiful; the want of dock accommodation at Cardiff and Newport, and the boisterous weather, are the only drawbacks to increased activity. The amount sent away from Cardiff last week was 113,659 tons foreign and 19,621 coastwise; Newport, 24,213 tons foreign and 18,477 coastwise; Swansea, 18,154 tons foreign and 8460 coastwise. Good colliery screened may be had at Cardiff at 11s. per ton. Prices in the Swansea district are as follows:—Steam: Birchgrove, 9s. f.o.b.; Tonda, 10s. 6d. f.o.b.; Dowlais, 10s. 9d. f.o.b.; Dyneford Duffryn, 9s. 6d. f.o.b.; Nixon's Navigation, 11s. 9d. f.o.b.; Powell's Duffryn, 11s. 3d. f.o.b.; Resolven, 9s. f.o.b.; Glasbrook's, 10s. f.o.b.; Hill's Plymouth Merthyr, 10s. 6d. f.o.b.; Ocean, 11s. f.o.b.; Llangennech, 10s. f.o.b.; Cwmaman, 10s. 9d. f.o.b.; Rhondda Mountain, 8s. 6d. f.o.b. Anthracite: Gwaun Cae Gurwen Big Vein, 7s. 6d. at the pit; Maes-y-Marchog, 7s. 6d. f.o.b.; Evans and Bevan, 8s. f.o.b. Patent: Atlantic, 10s. 9d. f.o.b.; Birchgrove, 10s. 9d. f.o.b.; Graigola, 10s. 9d. f.o.b. Although inferior sorts have risen 3d. per ton it is not expected that other qualities will be much affected unless there be a strike in the North or Midland.

The Iron and Steel Trades are well supplied with orders, but few new ones are coming in at present. Cardiff shipped 1799 tons last week, and parcels were sent away from Newport to the following extent:—Baltimore, 1840 tons; Aarhus, 1350 tons; Monte Video, 480; Cienfuegos, 423 tons; Maceio, 366 tons. Iron ore is coming in at a most satisfactory manner. Cardiff has received 11,901 tons from Bilbao, and 372 tons from other places; Newport, 10,785 tons from Bilbao, and 530 tons from other places. The price may still be quoted at from 15s. 3d. to 15s. 6d. per ton.

The Tin-Plate Trade is again resuming its unsatisfactory condition. Coke-mades have receded in price to 16s. 3d. to 16s. 6d.; charcoal-mades from 19s. to 20s. per box. The large arrivals of tin have had the effect of lowering prices. After falling to 981, this article is now quoted at 991 on the spot, and 1001 10s. three months. A few facts in connection with the growth of this trade at Llanelly may not be unacceptable. In 1860 the trade was represented by five mills, making 2000 boxes weekly, or a total of 90,000 boxes per annum. In 1870 the number was 10, one on sheet-iron and nine on black plate. These mills produced 4000 boxes per week, or 192,000 boxes per annum. In 1880 the number of mills had increased to 31, capable of producing from 600,000 to 650,000 boxes per annum. In 1850, in the district outside Llanelly, there were no tin mills. In 1880 there were in what is called Llanelly district (which included Yspytty, Llangennech, and Pontardulais), eight works, with 26 mills, capable of producing from 520,000 to 550,000 boxes annually. In 1880 there were in Llanelly and district 14 tin-plate works, with 57 mills, capable of producing annually from 1,130,000 to 1,200,000 boxes. The number of boxes of tin-plates exported from the port of Llanelly from 1850 to 1880 have been as follows:—In the year 1850, 15,041 boxes; 1860, 54,722; 1870, 89,558; 1880, 371,566. In addition to which considerable quantities have been sent per rail during the aforementioned periods to the great markets of London, Liverpool, Bristol, &c., for shipment to foreign countries, and also to the great markets of Birmingham, Manchester, &c.

REPORT FROM DERBYSHIRE AND YORKSHIRE.

Nov. 9.—The explosion which took place on Tuesday morning at one of the collieries belonging to the Clay Cross Company, as might be expected, has cast a deep gloom over the locality, the population of which is almost entirely mining. The loss of life is heavier than was at first expected, and is now considerably above 40. Of course there is no telling as yet how it took place—if indeed it will ever be made out—for in nearly all cases it has happened that those who could give the required information were numbered with the dead. Owing to slackness of orders only a portion of the usual workers were in the pit, which was certainly a fortunate circumstance. This slackness is certainly by no means usual at this period of the year at Clay Cross, for the company have been sending to London alone more than 6000 tons of coal weekly. But the change which has taken place by the mineowners giving the men the advances which have satisfied them has affected the trade considerably. When a strike on a large scale was looked forward to merchants and heavy consumers laid in considerable stocks, as prices were going up, and these will have to be lowered before there is anything like the same activity.

It is also probable that the existing price charged for household coal in the London, as well as in other markets, will gradually come down. Of course, to prevent this taking place, the representatives of a number of miners have passed a resolution for limiting the production, but this they will find is no easy matter to carry out; for, were the men to work five days a week instead of six, even with the advance, they would, of course, be worse off than they were before. It would then dawn upon the men that what they had been contending for was simply a little more play and a good deal less pay. Steam coal has been going off tolerably well, all things considered; but there is not so much doing in engine fuel, as manufacturers do not care to purchase at the advanced rates caused by the prospect of a strike. There has been about an average tonnage of coal sent away to the south and west, but these are simply in accordance with contracts. There has not been much change in the state of the Derbyshire iron trade of late. There are a large number of furnaces in blast, and the demand and the local consumption has been such that the stocks of pig held are comparatively moderate. In manufactured iron the business has by no means been brisk for a considerable time past, so that the output of the forges has been considerably below what the mills are capable of producing. There has been plenty doing in steel, the make of rails having in no way fallen off.

In Sheffield the threatened strike of miners caused for a short time something approaching what is termed a "scare," the manufacturers believing that their works would be seriously affected from a want of fuel. Consequently most of them purchased largely, and such was the run that coal merchants had no difficulty in getting exceptionally good prices; but this has now been changed, and fuel for manufacturing purposes can now be obtained at a lower rate. The general trade of the town is good, and the mills are working well on most descriptions of rolled material. Composite plates are being turned out on a large scale at the Atlas and Cyclops Works, and are consequently absorbing a large amount of both steel and iron. Ordinary plates, as well as sheets, bars, and wire of various qualities are in good request. The steelmakers, both Bessemer and crucible, have been working better than usual, the demands upon the resources continuing to increase.

In steel rails there is a fair business being done, and prices are said to be better than they were, but even now they are far below what they were in the earlier part of the year. This, of course, is in a great measure due to the increased competition on the part of persons who have had their old mills converted so that they can roll the steel rails, seeing that scarcely anything is being done in those made of iron. The cutlery houses are now well employed in table and other knives; but prices of the best qualities have gone up owing to the increase in the value of ivory, mother-of-pearl, and other descriptions of haughting. In edge tools, shears, saws, and files, a steady business continues to be done. Both foundries and engine-works are in a position to keep the men fairly employed, there being in particular a better output of heavy castings in connection with the machinery turned out by the Saville Street Company, as well as by others in the town and neighbourhood.

IMPROVED METHOD OF TREATING TIN ORES.

An interesting paper on this subject by Mr. W. Teague, jun., was attentively listened to at the recent meeting of the Mining Institute of Cornwall. The washing process, he explained, has always been inseparable in the treatment of tin ores, and the treatment employed in our mines now in the matter of washing is really about the same as for some years past. In a paper, he continued, which I read in the winter session of 1877, I gave a detailed description of the ordinary process of tin dressing, with diagrams, &c., of the different kinds of frames, buddles, tossing and packing machines used; and I believe the machinery in use is both efficient and economical up to a certain point, provided the appliances are well superintended by competent persons, that is to say, persons possessed of a certain amount of knowledge and experience to know the proper quantity and force of water required to make a proper separation in the different classes of ore. Of course, we are daily hearing the reflection on the waste of tin on our floors. I was asked my opinion about it some time ago. I then stated that I believed the greatest amount of loss would be where the greatest amount of tin was returned, and I said this advisedly, since all our treatment of tin is much on the same principle. I would like to ask those gentlemen who severely criticise our system of tin dressing, if they live in glass houses, and if so, please do not throw stones. Take, for instance, the same number of carpenters, smiths, or even farmers, to whom we concede almost perfection, and let the waste of their operations for 12 months be gathered up and made visible; and I take it that the loss in tin dressing would not compare so overwhelmingly unfavourable. I do not say there cannot be an improvement, and much tin that is now lost saved.

The purport of this little effort of mine is to show that with a different treatment at a certain stage of tin dressing great saving may be effected. It has occurred to me that as a first process we might shift our pegs a little to our advantage. I refer to stone-breakers being adopted generally. That is, from the shaft's mouth the material should pass on almost direct to a breaker, but our breakers should be much larger than those now used in Cornish mines, in order that the stuff may not be so evenly reduced. And for what purpose do I insist on this? In order that when the stuff is passed into the stamps the varying sizes should prevent the stuff acting as a cushion under the stamps-head, and thus partially rendering the action of the stamp ineffective. What was thought formerly to be a desirable thing and a benefit—the uniformity of the stuff, is a positive defect and injury in the stamping process. Hence I am rather puzzled to know where some mining gentlemen get their figures respecting the result of their stone-breaker. The question of sampling is important, and I would suggest this should be done after the stuff leaves the stamps. Our President, in his very valuable paper on stamping machinery the other day, suggested that one of the advantages of the new stamping-mills was the free discharge. This I believe to be quite right. At the same time I do not see why they may not be adopted in our stamping-mills generally, and I believe it would be a very great advantage. But the point to which I would call special attention, and one which I feel to be of vital importance to the question of tin waste, is the treatment of our dredge tin. (By dredge tin I mean coarse grain not properly reduced.) It is with this condition of tin that I think we sustain our great loss, and not so much with the fine, or properly reduced. And what I suggest as a remedy is the repulverising of this dredge tin. This seems to me to be a point to insist on.

Nature in the river process, by its large stream of water, rapid friction or grinding process does this, and we should do by art—by our pulverisers, what nature does for the Red River. You will understand, if looked at in this way, why it is that the man at the tail of the river gets on just as well as the man at the head, because the stream carries on the pulverising all the way down the river course, and is setting free the tin from the rough for the last man. Then what should we do? Take nature's hint, grind and grind again before it leaves the mine. I consider it best to stamp direct into the buddle, as nearly all the tin rests within 2 ft. of the head of the buddle. Here we suppose we get 20 per cent. of clean tin fit for the smelting-house, and then there is about 70 per cent. in a rough state that requires further reduction. This head should be buddled a second time, and all the clean tin taken out, and the remainder should be passed into the pulveriser at once, which would be discharged into a buddle, from which again you would get a fine head of tin, and let this process be repeated as often as necessary. This, I believe, would do much to change the balance of relationship between mine and Red River. With regard to the treatment of the tail of the stamps buddle, I should adhere to the present method of jigging machinery, which would reduce the bulk of the waste previous to pulverising.

In the course of the discussion which followed the reading of the paper, the Chairman, Mr. W. Husband said Mr. Teague had raised some important points. It was a fact that the dredge tin which went into the Red River was somewhat decomposed in its course down the stream, and by the act of dissolving became freed. If that were so, it seemed to him that there was a good deal in the view Mr. Teague had taken—that was the dealing with that ore or instuff before it left the mine. If you could find out a process which would carry on in the mine the same grinding or reduction that was carried on in the river, he did not see why the tin could not be recovered in the mine by artificial process as in the river by a process of nature. He might remark, upon Mr. Teague's proposition to sample the stuff after it left the stamps, that there might be objections to the adoption of that course where you had a great variety of stuff in the mine. It might, in that case, seem desirable to sample it before it went into the stamps; but, of course, where the coming from a lode was very uniform, the difficulty spoken of might not exist to any great extent.

The idea of the river pulverising the stuff was, in Captain Josiah Thomas's opinion, a new one. He believed there was a good deal in what Mr. Teague said about dredge tin, and if attention could be paid to that, he (Capt. Thomas) had no doubt that amount of tin could be saved. Mr. Thomas added that a cousin of his, returned from Australia, said that in a mine there the tin was dressed entirely by jigging. They had jiggers with short strokes that went very rapidly, and the system answered remarkably well, and seemed cheaper and more effective than any other mode of dealing with the material.—Mr. Frecheville had measured the holes in the sieves used in Cornish mines and found the holes were what might be called one-millimetre holes. He had visited some silver mines in Saxony, where the stuff left the coffers through holes of half-millimetre diameter. Mr. Frecheville went on to advocate the use of smaller sieve holes and the introduction of a separator for use after jigging, when a good deal of product would be obtained that could be sent direct to the pulverisers.—Capt. W. T. White thought with Captain Thomas that the greatest portion of the tin that went into the river was in the slime, and the great secret for them to find out was what plans should be adopted in order to save more of their slime tin; and went on to suggest that it might not be out of the way to adopt the plan of filtering.—Mr. Hosking said that, as far as he could gather, the more pure water they had to dress their stuff with the better would be the result secured in all mines. An important matter was to try to moderate the water in the buddles that they dressed the tin with. He was at a mine not long since where the water was moderated in such a way on the stuff treated that the separation was quite complete in itself.

Having been connected with mines for the last 25 years, Mr. Pike had seen the processes of treating tin going on, and he could not call to mind that any important stride or improvement had been made in tin dressing during that period. As far as slime tin went, Cornish mines seemed to have drifted back to the frame again. It appeared that in Tasmania and Germany other metals than those employed in Cornwall had been adopted with success. He had never seen any practical amount of jigging being done in Cornwall. Would it not be wise to take a lesson from those abroad, and at least to try some of those experiments that apparently succeeded so well in foreign countries? Jigging, for instance, which had been mentioned by two practical gentlemen, should be tried in Cornish mines. If it were a failure, of course they might revert to

their old system. Mr. Frecheville further explained that in Germany boxes were used to separate the coarser and finer material. The slimes were treated by the usual methods of buddling and framing. He did think they attempted to jig anything in Germany below half millimetre diameter.—The Chairman said if it were a fact that the slimes went into the river owing to the water being so thick on the mines, that would be fatal to jigging, because that water in jigging would hold in suspension what was called the slime tin, which was an impalpable powder, and would pass through less than half a millimetre hole.

Most of the tin would, Mr. Teague, jun., thought, be found about 2 ft. from the head of the buddle. He suggested that this should be re-buddled, which gave 20 per cent. more of clean tin that was fit for the smelting-house. He proposed that after that, instead of going on washing continually, all that stuff should be put direct into the pulveriser. You would then get from the head of the buddle a good per cent. of clean tin again that was fit for smelting-house. He maintained that there was too much washing going on on the floors of Cornish mines. With regard to jigging, which had been so prominently brought forward, and supported by Captain Thomas and Mr. Frecheville, he (Mr. Teague) quite agreed that a good separation could be effected by jigging machinery. He should recommend that from the head of the stamps buddle back to the tail the stuff should be taken up and passed through a jigging machine, and so get rid of the waste in that way. This jigging process would be more effectual than stripping. You would then reduce the quantity you wish to pulverise, and by pulverising you would take out a nice head of tin you could go to the smelting-house with after it had been calcined.

With regard to sampling the stuff, it would not be practicable perhaps always to take the samples out of the buddle, though he did not see why it might not be done as a general rule; but if it appeared desirable to do it otherwise, there was no objection to taking the samples before the stuff went into the stamps. He thought that as three-quarters of the tin caught in the Red River was slime tin, and there was with that stuff passing off in the dredge grain, their sampling could not be so effective as it should be. Oftentimes a great waste occurred through inattention. He did not like to bring up the subject of inattention, because he might reflect on himself; but he believed that much of the tin could be saved that was at the present time going down the river. At the same time, the object of the paper was to call attention to the first process from the stamps into the buddle and from the head of the stamps buddle, so that you might pulverise the stuff at once, and thus save tin which was now going to waste. With regard to the remarks as to the pulverising in the Red River, the action of Michell's and Tregoning's pulverisers was simply the action of the Red River. He did not mean to say but that slime tin was going away, but the arrangements they had for dressing tin were almost perfect. He did not see what better arrangements they could have for the purpose with the exception of the jigger. Their frames and buddles were very good. He thought that attention and a sufficient number of frames and clear water had a great deal to do with the catching of the fine tin.

THE MINERAL RESOURCES OF IRELAND—No. III.

BY THOMAS TONKIN, M.E.

A zone or belt of clay-slate country running nearly east and west from near Castletownsend to the Common Mountain, south of Clonakilly, about 12 miles long and 1½ mile wide, deserves attention, and I shall, therefore, describe briefly the mines and indications of mineral contained therein, which have come under my notice. But before entering upon this I wish to mention the existence of a parallel range of slate-rock extending from Leap to Ross Carberry, a distance of six miles, and on which two or three good slate quarries have been opened and are in active operation; they produce roofing slate of superior quality, which is somewhat largely exported and also meets with a good local sale. The Benduff and Madrenna Quarries are the largest, but all are capable of very much extension, and had a tramway been constructed to the Glandore Harbour from the quarries, about three miles, the profits would be greatly increased, and exportation may then be effected more largely, and at a much cheaper rate. At Bawney's Hall, west of Castletownsend, a mine was worked for copper 20 years ago; green carbonate of copper is there found diffused through a soft and congenial bed of shale, but as no extensive operations were carried on it remains to be proved whether the surface indications lead to a rich vein of ore deeper down. On the roadside from the village of Leap to Glandore there is a fine section of that part of the country shown for upwards of a mile in length, owing to the cutting for the roadway having penetrated the strata, and, being at right angles to the strike of the rocks, three copper ore lodes are therein exposed to view, and one large and powerful caunter lode, which latter is particularly interesting, as it is a true fissure vein and assumes very considerable proportions in places, and can be traced 3½ miles south-east to the Rowley Glens. At one place, called the Glandore Manganese Mine, this lode is from 6 to 10 fathoms wide, and at no place seen is less than 6 ft. wide. The gangue is composed of quartz and oxide of iron, the latter predominating near the surface, and the former assuming greater proportions in the deeper workings it also produces compact limonite and ruby copper ore; but its most abundant yield has been manganese ore (pyrolusite), and for 12 or 14 years of the 35 years the mine had been in operation large profits were derived from the sales of manganese ore. The manganese was found not only in the vein proper, but also flatted away in beds into the south wall for 7 to 8 fathoms in some instances.

One of the copper ore lodes noticed above as having been seen in the roadway forms a junction with the great caunter or manganese lode near the manganese mine, and a splendid bunch of ruby copper was obtained there; but unless very recent trials have been made there was nothing of consequence done at the time of the discovery more than to work out the ore in sight and penetrate the lode a few fathoms deeper. In the bottom of the big stopes at the Glandore Mine limonite seems to be the prevailing mineral. Spots of yellow ore were, however, showing in the quartz at the bottom, which would seem to indicate that in deeper ground copper ore would become more general. The course of this lode south-east to the Rowley Glens brings it in close contact with the dismal ruins of Coppenger Court, with its frowning battlements, from whence went forth in olden times a reign of terror such as is seldom recorded in history. At Rowley Glens several parcels of manganese ore was obtained about the time of the first starting of the Glandore Mines, but though the lode is seen very regular the quality of the ore is not so good as at the last-named place. The magnificent scenery of Glandore it is difficult to find words to adequately portray—suffice it to say, that poets have long and ardently sung its praises, and health and pleasure seekers take up their abode in the vicinity. The Glandore Harbour is safe and commodious, and is often the harbour of refuge for the fishing fleet that assembles off the coast from France, Lowestoft, Scotland, Isle of Man, &c.; and if I may be allowed the digression I may add that Dantry, Crookhaven, Schull, Baltimore, and Glandore would make the finest series of fishing stations in Great Britain; the surrounding water is teeming with fish, as the quantities annually obtained there testify. Enterprising fishermen from distant parts procure fish there in large and very remunerative quantities, and if stations were established on the coast where they had ready access to the fishing ground, and with proper fishing gear, a splendid industry might be established. I have very little knowledge in this branch of industry (fishing); but the advantages are so palpable that I cannot refrain from a few remarks, foreign though it be to the subject under consideration.

South of Ross Carberry large boulders of manganese ore are observable on what would seem to be a continuation of the Glandore manganese lode; but no vein is seen at surface, owing to a thick stratum of alluvium covering the rocks; the shode stones, however, here referred to have evidently come from the back of a lode in the immediate vicinity.

Near Castle Freak, east of Ross Carberry, there are two or three large quartz veins, with indications of copper. No trials, however, have been made upon them, nor do they deserve any till the many more promising lodes in the district are attended to. At the Common Mountain, south of Clonakilly, they are two strong lodes of barytes,

from which many cargoes have been shipped away. The ore has been taken out from the surface quarry fashion, leaving the walls of the lode standing, and excavations are seen in parts 10 or 12 fms. deep. This rough-and-ready system has resulted in obtaining the barytes near the surface only. To follow it deeper other modes of working will have to be resorted to, and as seemingly very large quantities may be obtained there it will, no doubt, eventually be properly worked.

A lead ore mine has also been worked on a parallel vein to the barytes lode; the gangue is composed of barytes and carbonate of iron. Good samples of galena were obtained at the time of the so-called working of the mine, but a few fathoms sinking beneath the surface came on water, and no efforts were made to go deeper; the kills containing the lead ore vein is of a very kindly nature, and if the mine were tried in deeper ground it is likely to improve.

At Ringabella, 10 miles from the city of Cork, and on the west passage side of the water, the formation is carboniferous slate, and contains some lead ore veins of a continuous and regular nature, showing ore in small quantities at surface, and not unlikely to yield or contain ore in considerable quantities at a reasonable depth. One of these veins was worked 40 years ago, and a few shipments of lead ore made from a depth, varying from 5 to 15 fms. beneath the surface; the gangue of the lode is composed of quartz, and at the place where the mine was worked is from 2 to 5 ft. wide, very much tilted and disturbed in places from the influence of slides, &c. This is a promising piece of mineral ground, but has had no trial but surface scratchings to the level of the water and talc, which may be told of nine-tenths of the Irish mines, and will continue to be told till a fair amount of capital is employed in their development, and when that is done it would be a bold man that would assert there is not a brilliant future before Ireland.

FOREIGN MINING AND METALLURGY.

The Belgian coal trade continues firm, and the markets have, if anything, been further hardening. The cold of winter has not yet made itself felt, and this has prevented the demand for domestic qualities becoming more decided, although industrial coal has been readily taken off as fast as it has been brought to market. Working operations are everywhere carried on with vigour, and the production is considerable, although at the same time it does not exceed the demand. As soon as the cold of winter makes itself felt a rise is anticipated in domestic qualities. In the Couchant de Mons coal has become scarce, and contracts on Parisian account have been concluded without hesitation at an advance of 1s. 8d. per ton, as compared with the rates current some months since. The German coal trade has remained without change; the demand is considerable, but not sufficiently active nevertheless to involve an advance in prices. The production of the Dortmund district exhibits a decided increase. In the third quarter of this year the production amounted to 6,777,153 tons, as compared with 5,974,604 tons in the corresponding quarter of 1881. The production in the third quarter of this year will be seen to have increased 802,554 tons, or 13½ per cent. In the first nine months of this year the production of the Dortmund group was 18,881,679 tons, against 16,907,523 tons in the corresponding nine months of 1881, showing an increase of 1,974,156 tons, or nearly 13 per cent. The number of workmen engaged this year in the Dortmund district shows an increase of 8 per cent. as compared with 1881. In the Wrin district the production has also increased.

The Belgian iron trade has presented, if anything, a little less animation; at the same time, business has remained in a generally satisfactory state. For some descriptions of products there is, perhaps, a slightly less active demand; but, at the same time, there is plenty of employment, and if one or two works made concessions of no great importance in regard to prices employment would be still more general. English pig has not been very well supported in Belgium; at the same time, prices have not gone below 22. 12s. per ton. Belgian pig has continued to be well maintained. At Charleroi almost all the production for the first quarter of 1883 has been disposed of. Under these circumstances the proprietors of blast furnaces show little disposition to force sales. The current rate demanded is 22. 12s. per ton, but business would probably be done in some cases at 22. 10s. per ton. At Athus the price asked for casting pig is 22. 12s. per ton, and for refining pig 22. 6s. per ton, and No. 1 iron is quoted at 52. 8s. per ton, with a difference of 8s. per ton per number. Girders have maintained a quotation of 52. 16s. per ton to 62. per ton. Plates have been in active request, especially in the Liège district. The basis price of No. 2 plates is 72. 12s. per ton, while boiler plates have brought 82. 8s. per ton. The Belgian Construction Workshops are very well employed, except those devoted to the construction of railway plant other than locomotives. An adjudication is about to take place of 17,000 tons of steel rails for Greece. The Belgian Exportation Company has obtained a contract for water pipes for the City of Maryborough, Queensland. The same company has also obtained an order for 30,000 tons of steel rails for Australian lines. It is thought that the recent visit to Belgium of Sir Henry Parkes, the Chief Secretary of New South Wales, has had something to do with these orders. The house of Verhaere and Jager has obtained an order for 4000 tons of rails, together with accessories and plant, for the St. Paul and Sorocabá (Brazil) Railway, as well as for plant for the St. Antonio Railway Company of Padua. An order has also been obtained for the plant required for several sugar works in Java, as well as for special railways intended to bring the cane down to the sugar works. Further orders have been obtained for rails for Mexico, and miscellaneous machinery for other countries.

The iron trade has been a little quieter at St. Dizier. The orders received have been for re-assortments principally, but some rather heavy contracts have at the same time been concluded. Plates have been in good demand. The condition of the German iron trade has not materially changed. The production of pig in September in Germany was on a considerable scale. It amounted to 272,000 tons, as compared with 226,000 tons in September, 1881, showing an increase of 46,000 tons this year. In the third quarter of this year the ironworks in the Dortmund district produced 225,156 tons of pig, 144,139 tons of iron, and 253,092 tons of steel. The Rhine Steel Works Company of Rhotof has obtained orders for 230 locomotive tyres at 171. 15s. per ton. Orders for 3560 tyres for trucks and tenders have been divided between the Osnabrück and Bochum works. The contract rates ranged between 92. 15s. per ton and 102. 18s. per ton. Quotations in the German iron trade have not generally varied.

HEAVY PENALTY FOR IMPORTING UNPULVERISED DYNAMITE.—At the Whitehaven Police Court, on Monday, Messrs. Whittle, ironmongers, Whitehaven, were fined 50l. for having imported into Whitehaven 22,000 lbs. of dynamite not thoroughly purified in accordance with the licence granted by the Home Secretary. Lieut.-Col. Ford, Government Explosives Inspector, laid the information. Mr. Atter, solicitor, Whitehaven, prosecuted on behalf of the Treasury, and Mr. Webster defended. The material had been forwarded to the defendants by Messrs. Krebs, from Rotterdam, and upon samples being analysed by Mr. Dupré, on behalf of the Government, it was found that the whole cargo would not stand the heat test, which is 15 min., some of the samples standing only 7½ min. Col. Ford had allowed defendants to re-ship the dynamite to Germany, and Mr. Webster stated that it had cost his clients 600l.

PUMPS.—The object of the invention of Messrs. GILLMORE and SHAW, of Normandale, Ontario, is to overcome the weight of a column of water in the discharge tube of a pump by counterbalancing it with a like discharge tube, both tubes being hung to reciprocate perpendicularly whereby water can be pumped with ease. The invention consists of two vertical pump tubes hung to reciprocate, each tube having valved connection with a cylinder submerged in the well, and within each cylinder is placed a plunger fixed suspensively, over which the cylinder slides, whereby the pump tubes counterbalance, and their reciprocation ejects the water in alternate succession. Water is discharged at the upper end. The lower end of the tubes connect with a vertical cylinder attached to said tubes which are hung suspensively by a chain or belt passing over a rocking segment or pulley pivoted to a post bearing on the platform of a well

Lectures on Practical Mining in Germany.

CLAUSTHAL MINING SCHOOL NOTES—No. CCVI.*

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In some places the arrangement at the pit bank for tipping the material out of the kibble into the wagon is made self-acting, of which we give three examples. The vessel in which the mineral is raised is guided in the shaft by a couple of wooden conductors, one on each side of the cage. The vessel is guided along the conductor by three pins on each side; two of these are placed vertically beneath each other, one near the top and the other near the bottom of the vessel; the third pin is placed about the middle of the vessel; the centre of this pin is at the same distance from the centre line of the vessel as the vertical line joining the centres of the other two pins, but on the opposite side. The conductors are placed opposite the centres of the sides of the vessel. At the pit bank a second conductor is placed parallel to the first, and between these the two pins vertically above each other slide. At a convenient point above the pit bank the auxiliary conductors are broken for the insertion of short hinged pieces. These two hinged pieces are connected by a common axle, to one end of which a weighted lever is attached; this tends to keep the hinged pieces projecting into the space between the two conductors. The main conductors are broken at a point above the top of the hinged pieces equal to the distance between the top and bottom pins. As the kibble is raised above the pit bank the top and bottom pins successively push back the hinged pieces. The raising is then stopped, and the winding reversed; the kibble drops until the bottom pins rest on the top of the hinged pieces. As, however, the centre of gravity of the kibble lies to one side of the point of support, the kibble tilts over as the rope is paid out, the main conductors being broken, as already mentioned, to allow the top pins to pass. The kibble is overturned until the middle pins catch against the main conductors. The inclination of the kibble will thus depend on the positions of the top and bottom pins, and will generally amount to 45°. When the kibble is empty the rope is wound up until the kibble returns to its original position, and sufficient to lift the bottom pins off the hinged pieces. The weighted lever is then raised, moving the hinged pieces back into the recesses in the auxiliary conductors, when the winding is reversed, and the kibble lowered down the shaft. Immediately the pins have passed the hinged pieces the weighted lever is lowered, projecting the hinged pieces into their original positions.

In the next arrangement from the Mansfeld district the whole of the tipping is worked automatically by raising and lowering the kibble. In the arrangement to be now described there are only two pins on each side of the kibble. The top ones form at the same time the pins over which the eyes of the bow handle of the kibble are passed. The two bottom pins may be formed of one piece of iron, flattened in the middle, so that it may more readily be bolted or rivetted to the bottom of the kibble. The vertical line joining the top and bottom pins is at one side of the centre line of the kibble, so that when the latter is supported only on the bottom pins, it tends to tilt over on one side. The pins run between a pair of conductors on each side of the kibble. At a suitable point above the pit bank a flat spring is fixed to the inside of one of the conductors, in which is cut a triangular recess, in which the spring fits when pushed back by the pins. The spring is fastened at its lower end by a couple of screws or bolts to the conductor; the upper end of the spring terminates in a broad, slightly concave, piece, with an eye at the back to which a link is fixed; the other end of this link is attached to the short arm of a bent (90°) lever, which in mid-position hangs vertically. The horizontal arm of the lever projects in its normal position across the space between the two conductors; it is so attached to the axis about which it is centred that it can move upwards without moving the shorter arm; it cannot, however, be moved downwards without moving the shorter arm, and thus pulling the upper end of the spring back into the recess. The tipping is effected in the following manner:—The kibble is raised until the bottom pins have just passed the upper end of the springs, which after the passage recoil back into their normal position, projecting across the space between the two conductors. The winding is then stopped, and the rope reversed. When the bottom pins catch against the top of the springs the upper end of the kibble tilts over to one side owing to the centre of gravity lying to one side of the vertical line through the bottom pins. One of the conductors is broken to allow of the passage of the top pin. When the tilting of the kibble has taken place to such an extent that all the mineral has fallen out, the winding is reversed, and the kibble raised until the bottom pin has passed above the horizontal arm of the lever, which drops back into a horizontal position immediately after the passage of the bottom pin. The winding is again reversed, and the kibble lowered. When the bottom or top pins come against the horizontal arm of the lever the weight of the kibble is such that the long arm is depressed, drawing the spring back into the recess formed for it in the conductor. The length of the long arm is such that it is not released until the pin has passed well below the upper end of the flat spring so that the kibble is free to descend. In this as in the first arrangement the kibble can be emptied into the wagon direct, or the contents can be allowed to fall on to an inclined table.

The following is the arrangement at the Ottilie shaft, near Clausthal:—A movable hopper is arranged at the mouth of each winding compartment, which in its normal position is drawn to one side, leaving the mouth of the compartment open, whilst in a second position the mouth of the compartment is closed. In this second position the four sides are vertical; the open top is horizontal, and the bottom is inclined about 45°. The normal position of the hopper is at an angle of about 45° with the position in which it closes the mouth of the shaft, and in this position the bottom of the hopper is vertical. The longest side of the hopper is open, and along the junction of this side with the bottom the hopper is hinged to the framework of the head gear. The upper ends of the hopper are connected by two series of ropes or chains and pulleys, with two sets of weights, one set of which are heavier than the other. The heavier weights keep the lighter weights raised, and the hopper in its normal position, resting against the framework of the head gear, with the mouth of the shaft free. When the heavier weights are raised, as will be hereafter described, the lighter ones are free to descend, pulling over the hopper into the position, closing the mouth of the shaft. The heavier weights are suspended close to and alongside the respective winding ropes. When the winding rope has been raised a sufficient distance the framing of the cage or vessel catches against the heavy weight and raises it, at the same time relieving the lighter weights, which commence to draw up the hopper to close the mouth of the shaft. This movement is not completed until the vessel containing the mineral is well above the hopper. When the winding rope has been raised to its highest position, carrying with it the heavier weights, a catch or bolt is pushed forward by a lever arrangement to support the heavier weights. The vessel containing the mineral can then be lowered on to the hopper, which remains in its position, closing the mouth of the shaft. When the vessel or kibble has been lowered on to the inclined bottom of the hopper, and the winding rope let out still further, the kibble overturns, emptying the mineral into the hopper, down which it slides on to an inclined table, and thence into the wagons for transport to the dressing floors. When the vessel has been emptied it is raised again until it catches against the heavy weights, the supports of which are now withdrawn, allowing these to descend as the motion of the rope is reversed, and in so doing to draw back the hopper, leaving the mouth of the shaft free for the passage of the kibble.

In some metalliferous mines the kibble in which the minerals are raised is provided with a hinged bottom, which can be loosened when the kibble arrives at the pit bank. The kibble is either drawn sideways from the pit mouth, and the contents emptied on to an

* Being Notes on a Course of Lectures on Mining, delivered by Herr Berggrath Dr. von Groddeck, Director of the Royal Bergakademie, Clausthal, the Harz, North Germany.

inclined platform or table, or a trolley or wagon is run on a sliding bridge, which is pushed over the mouth of the shaft, and the contents of the kibble entered thereon. We have detailed these arrangements in the chapters on shaft sinking.

2.—The vessel in which the minerals are raised is detached from the rope. When this is the case a rolling bridge is run over the mouth of the shaft, and the kibble placed thereon, and occasionally a small trolley is placed on rails on the rolling bridge, the frame of the trolley being specially constructed to receive the kibble. These arrangements have also been previously described, so that we shall only add a description of a partially self-acting roll bridge formerly in extensive use in Belgium. The mineral is raised in small wagons which are attached directly to the winding rope, and on arriving at the bank are placed on rails on the roll bridge. The roll bridge is carried on four wheels, and runs on a pair of inclined rails, so that when at the bottom of the incline it covers the mouth of the shaft. In this position the rails on the top of the roll bridge are against and in line with a pair of rails on the pit bank. In consequence of the inclina-

tion of the roll bridge the wagon readily runs off it on to the pit bank. The back end of the roll bridge is attached to a chain or rope which passes round a pulley fixed to the top of the incline. The rope passes thence to a couple of pulleys fixed up in the head gear, and thence downwards to the front of the head gear framing, being attached to a door or railing which can slide vertically up and down, and in the latter position closes the entrance to the mouth of the shaft; this balances the pull of the roll bridge. When the wagon containing the mineral approaches the top of the shaft the guide frame attached to the winding rope raises the sliding door, and the weight of the roll bridge causes it to descend the incline and cover the mouth of the shaft, where it is held in position (during the detachment of the full and attachment of the empty wagon to the rope) by a catch, which can afterwards be released by foot. The sliding door is held up in its highest position by bolts or catches actuated by a rod and lever. The mode of working will be evident from the above description.

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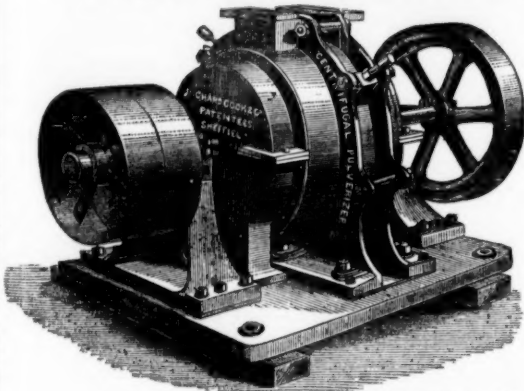
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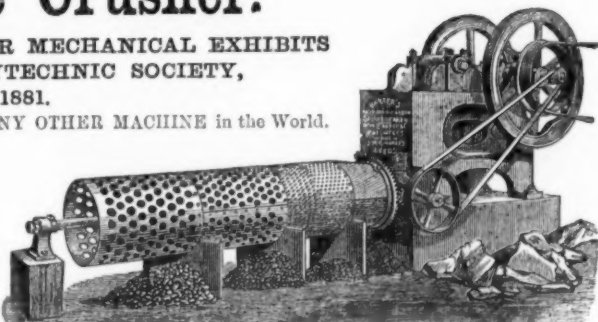
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GENTLEMEN,—We have the pleasure to inform you that the 20 by 9 Stone Breaker supplied by you is now working to our entire satisfaction, and we are now able to fulfil our contract with ease, which we had much difficulty in doing before with the Blake Machine. It takes less power and turns out considerably more stone.
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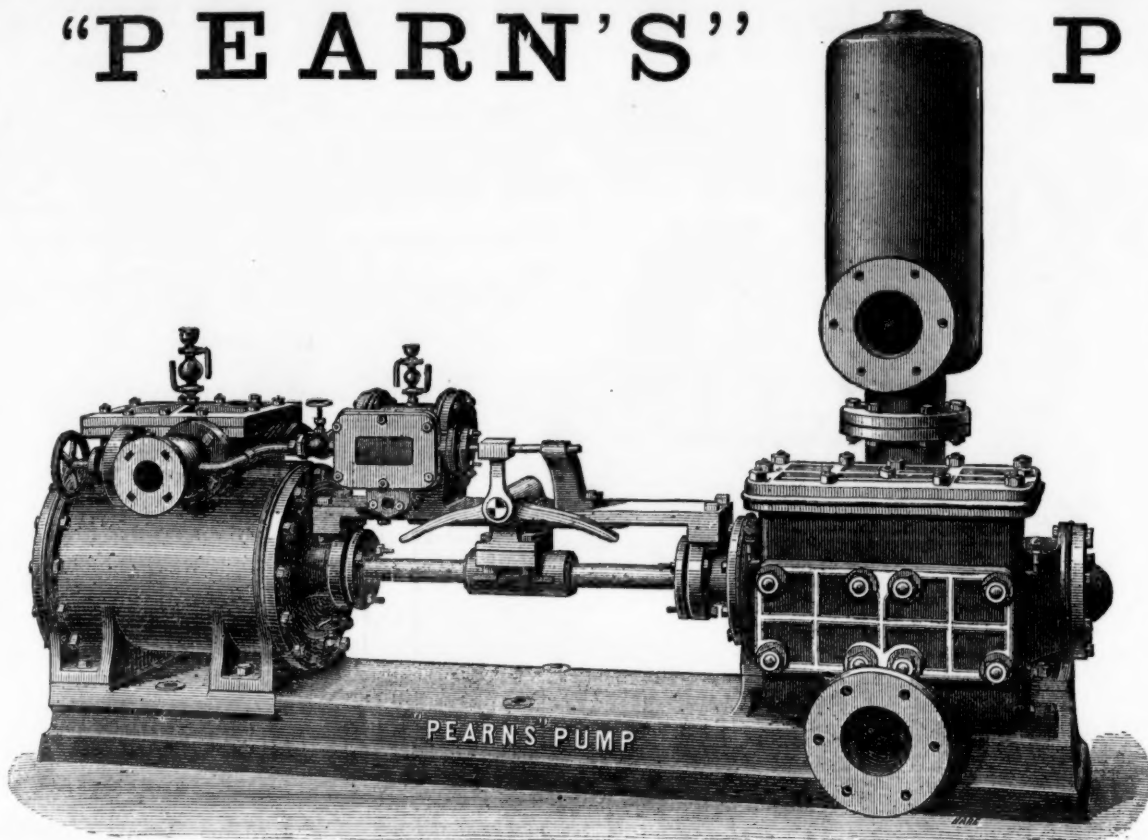
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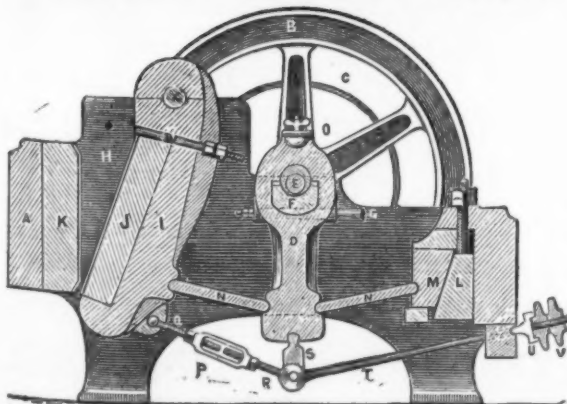
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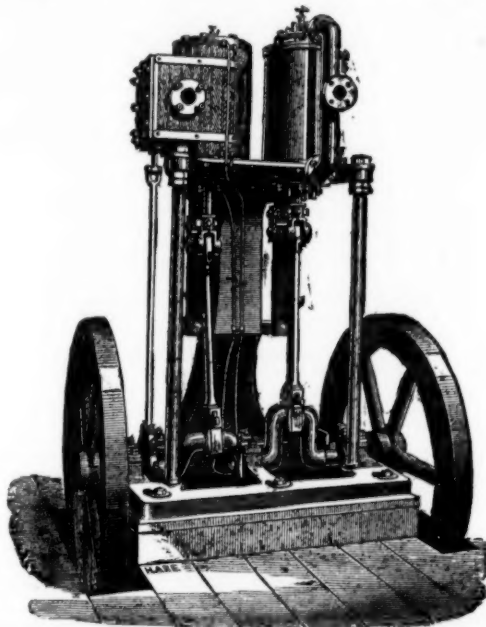
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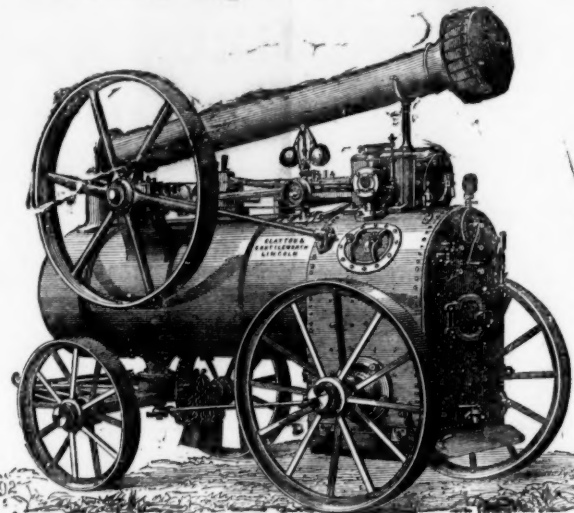
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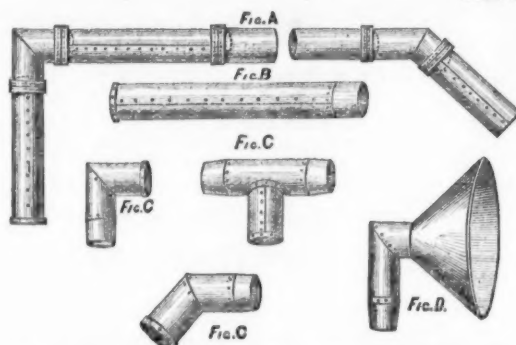
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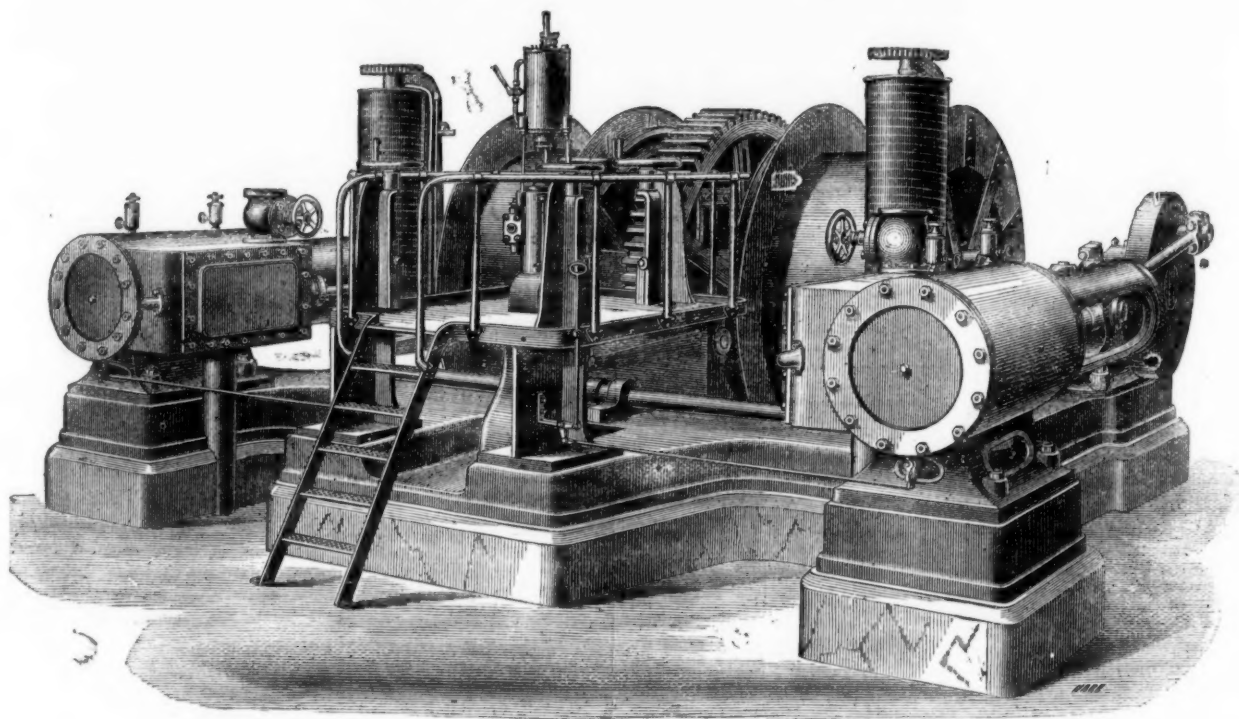
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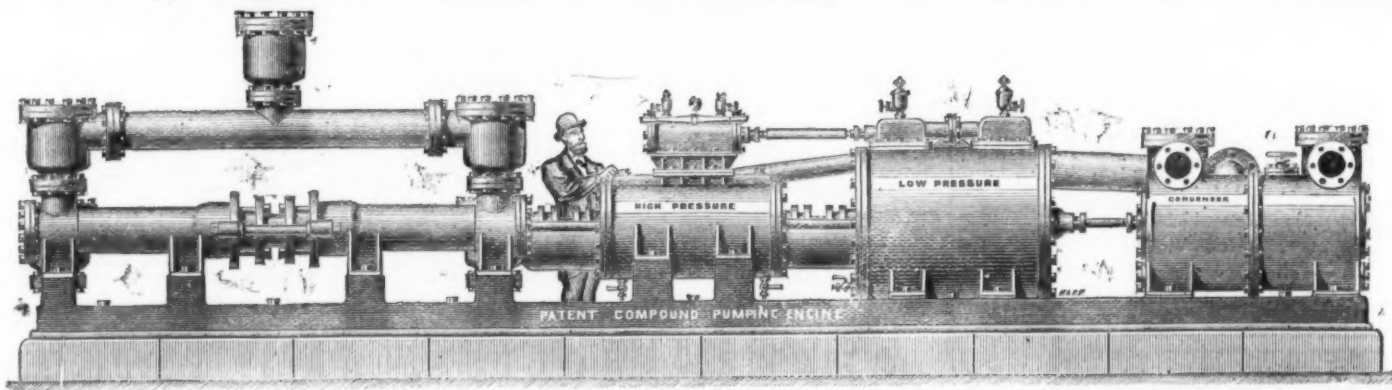
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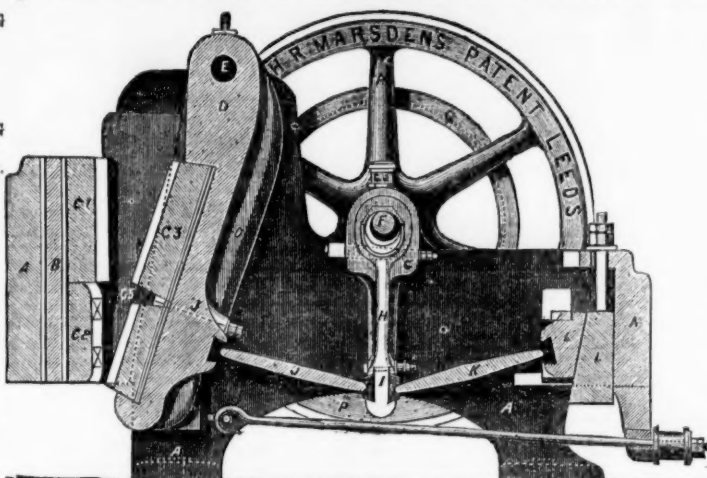
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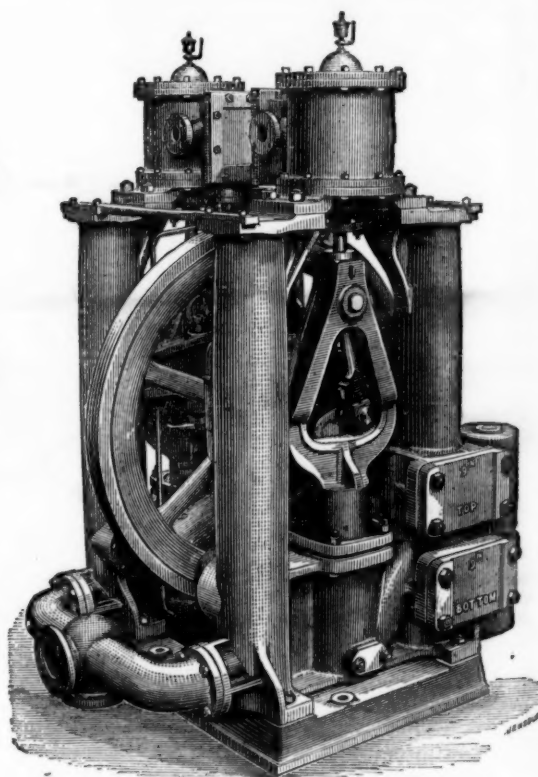
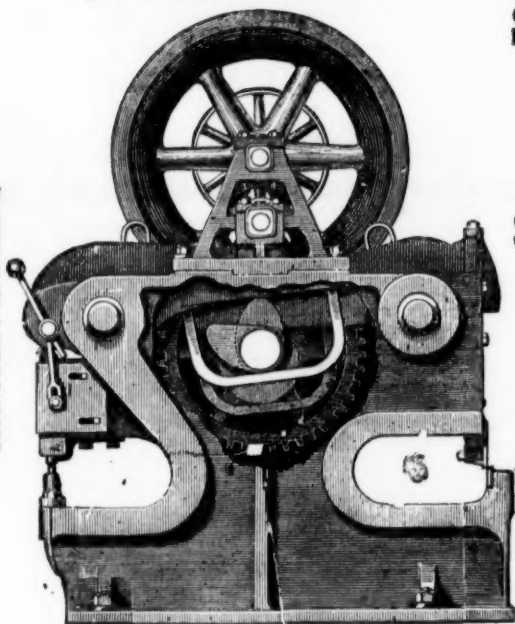
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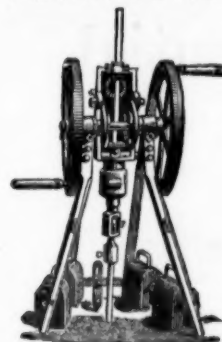
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